WEEKLY CURRENT AFFAIRS MAGAZINE for

U.P.S.C.-C.S.E.

JANUARY-VOL-III-2024

16 January to 22 January

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Topic 1. NISAR MISSION ON TRACK FOR A LAUNCH SOON: NASA OFFICIAL

Important for the subject: Science and Technology

The **NASA-ISRO Synthetic Aperture Radar (NISAR) Mission,** designed to observe natural processes and changes in Earth's complex ecosystems, is on track for an "early 2024" launch.

- **The Joint Collaboration: NISAR** is a **Low Earth Orbit observatory** developed jointly by **NASA** and **ISRO**, highlighting **international collaboration** in space exploration.
- **Launch Vehicle:** The mission is set to launch from the **Satish Dhawan Space Centre** in **Sriharikota** onboard **ISRO's GSLV Mark-II launch vehicle.**

- **Data Utility: NISAR data** will offer unprecedented detail and assist researchers in various ways, including **monitoring volcanic activity, tracking groundwater use effects, measuring ice sheet melt rates,** and **observing changes in global vegetation distribution.** The open science and open data policy makes the mission unique in its scope.

- **Mission Life:** The **$1.5-billion NISAR mission** has a planned mission life of **three years** and will **survey Earth's land and ice-covered surfaces every 12 days** following a **90-day commissioning period.**

Advanced SAR Technology

- **Dual-Band SAR: NISAR** carries **L** and **S dual-band Synthetic Aperture Radar (SAR)** using the **Sweep SAR technique,** providing both wide coverage and high-resolution data.

- **Observatory Structure:** The **SAR payloads** are mounted on the **Integrated Radar Instrument Structure (IRIS)** along with the spacecraft bus, forming an observatory.

- **Contributions: NASA's Jet Propulsion Laboratory (JPL)** provides the **L-band SAR** and several key components, while **ISRO's U R Rao Satellite Centre** contributes the spacecraft bus, **S-band SAR electronics,** launch vehicle, and mission operations.

Important Milestones achieved

- **Thermal Vacuum Testing:** The **thermal vacuum testing,** a critical system-level test, was successfully completed in Bengaluru. This test ensures that the spacecraft can operate effectively under extreme temperature conditions.

- **EMI and EMC Testing: Electromagnetic interference (EMI)** and **electromagnetic compatibility (EMC)** testing have also been successfully accomplished.

- **Upcoming Vibration Tests:** The next phase involves conducting vibration tests to simulate the harsh launch environment. This test will Important for the subject the satellite to intense vibrations while mimicking the conditions of a rocket launch.

Topic 2. INDIA AMONG NATIONS OVERUSING "WATCH" GROUP ANTIBIOTICS

Important for the subject: Science and Technology

In the Data Point published from a government survey ("**Over 38% patients on more than one antibiotic**"), which shows that an overwhelming number of inpatients are prescribed antibiotics by hospitals across India.

Antimicrobial Resistance

- Antimicrobial Resistance is the **resistance acquired by any microorganism (bacteria, viruses, fungi, parasite, etc.) against antimicrobial drugs** that are used to treat infections.

- It occurs when a **microorganism changes over time and no longer responds to medicines** making infections harder to treat and increasing the risk of disease spread, severe illness and death.

- The World Health Organisation (WHO) has identified AMR as one of the **top ten threats to global health.**

- Microorganisms that develop antimicrobial resistance are sometimes referred to as **"superbugs".**

Reasons for the Spread of AMR

- **Antibiotic consumption in humans: Unnecessary and injudicious use of antibiotic** fixed dose combinations could lead to emergence of bacterial strains resistant to multiple antibiotics.

- **Social factors:** Include self-medication, Access to antibiotics without prescription, Lack of knowledge about when to use antibiotics.

- **Cultural Activities:** Mass bathing in rivers as part of religious mass gathering occasions, Antibiotic Consumption in Food Animals, Antibiotics which are critical to human health are commonly used for growth promotion in poultry.

- **Pharmaceutical Industry Pollution:** The wastewater effluents from the antibiotic manufacturing units contain a substantial amount of antibiotics, leading to contamination of rivers and lakes.

- **Environmental Sanitation:** Untreated disposal of sewage water bodies – leading to contamination of rivers with antibiotic residues and antibiotic-resistant organisms.

- **Infection Control Practices in Healthcare Settings:** A report on hand-washing practices of nurses and doctors found that only 31.8% of them washed hands after contact with patients.

Initiatives taken to Prevent AMR

- **National Programme on AMR containment:** Launched in 2012. Under this programme, AMR Surveillance Network has been strengthened by establishing labs in State Medical College.

- **National Action Plan on AMR:** It focuses on One Health approach and was launched in April 2017 with the aim of involving various stakeholder ministries/departments.

- **AMR Surveillance and Research Network (AMRSN):** It was launched in 2013, to generate evidence and capture trends and patterns of drug resistant infections in the country.

- **AMR Research & International Collaboration:** Indian Council of Medical Research (ICMR) has taken initiatives to develop new drugs /medicines through international collaborations in order to strengthen medical research in AMR.

- **Antibiotic Stewardship Program:** ICMR has initiated Antibiotic Stewardship Program (AMSP) on a pilot project across India to control misuse and overuse of antibiotics in hospital wards and ICUs.

- **DCGI had banned 40 Fixed Dose Combinations (FDCs)** which were found inappropriate.

Ministry of Health and Family Welfare (MoHFW) has taken following initiatives to promote judicious use of antimicrobials:

- Red Line awareness campaign on Antimicrobials Resistance, urging people not to use medicines marked with a red vertical line, including antibiotics, without a doctor's prescription. Indian Council of Medical Research (ICMR) has released treatment guidelines for antimicrobial use in common syndromes which contain guidelines for use of antibiotics for viral bronchitis and low-grade fever.

- Antibiotics are included in Schedule H and H1 of the Drugs Rules, 1945. These drugs have specific caution labeling requirements and are sold only under the prescription of a Registered Medical Practitioner.

- The supply of a drug specified in Schedule H1 are recorded in a separate register at the time of the supply and such records are maintained for three years and are open for inspection. Central Drugs Standard Control Organisation (CDSCO) has placed 24 hi-end

antimicrobials under schedule H1 by issuing notification.

What are the Global Measures?

- **World Antimicrobial Awareness Week (WAAW):** Held annually since 2015, WAAW is a global campaign that aims to raise awareness of antimicrobial resistance worldwide and encourage best practices among the general public, health workers and policy makers to slow the development and spread of drug-resistant infections.

- **The Global Antimicrobial Resistance and Use Surveillance System (GLASS):** WHO launched the GLASS in 2015 to continue filling knowledge gaps and to inform strategies at all levels.

AWaRe

- The AWaRe tool was developed by the WHO Essential Medicines List to contain rising resistance and make antibiotic use safer and more effective by providing guidelines (over the effective use of antibiotics) to the policy-makers and health workers.

It classifies antibiotics into three groups:

- Access— first or second choice antibiotics, offer the best therapeutic value while minimizing the potential for resistance, these antibiotics used to treat the most common and serious infections. E.g. Amoxicillin.
- Watch— first or second choice antibiotics, only indicated for specific and limited number of infective syndromes, more prone to be a target of antibiotic resistance and thus prioritized as targets of stewardship programs and monitoring. E.g. Ciprofloxacin.
- Reserve— antibiotics to be used sparingly or preserved and used only as a last resort.

Topic 3. PROJECT BHISHM

Important for the subject: Science and Technology

Two Arogya Maitri Disaster Management Cube-BHISHMA have been deployed in Ayodhya to bolster medical readiness and response capabilities during the upcoming **'Pran Pratishtha' ceremony.**

Prime Minister Narendra Modi will visit Ayodhya for the **Pran Pratishtha ceremony** on January 22, 2024 and 8,000 guests are expected to attend the event.

About Project BHISHMA:

- The **Arogya Maitri Disaster Management Cube-BHISHMA** is a revolutionary mobile hospital equipped with cutting-edge technology.

- This cube is a part of the broader initiative named "Project BHISHM" – **Bharat Health Initiative for Sahyog, Hita and Maitri.** It is tailored to **treat up to 200 casualties, emphasizing rapid response and comprehensive care.**

- This **Aid Cube** is equipped with several innovative tools designed to enhance disaster response and medical support during emergencies.

- It integrates **Artificial Intelligence (AI) and data analytic**s to facilitate effective coordination, real-time monitoring, and efficient management of medical services in the field.

- The **whole unit contains 72 easily transportable components** that can be conveniently carried by hand, cycle, or even drone.

- Advanced medical equipment, **RFID-tagged for efficient repacking** and **redeployment**, is a key feature of the Cube.

Benefits of the initiative:

- This project will effectively bridge the **crucial time gap from primary care to definitive care,** potentially saving numerous lives in the golden hour of emergencies.

- These cubes are robust, waterproof, and light, designed for various configurations, making them ideal for diverse emergency scenarios.

Topic 4. CALL FOR PRE-PROPOSALS FOR SETTING T-HUBS LAUNCHED UNDER NATIONAL QUANTUM MISSION

Important for the subject: Science and Technology

A milestone in the journey of the **National Quantum Mission (NQM)** is reached with the launch of the call for pre-proposals for setting up **Thematic Hubs (T-Hubs).**

About the initiative:

- The initiative is launched by the **Secretary, Department of Science and Technology (DST).**

- The **preproposal invites academia institutions/ R&D Lab**s to submit innovative pre-proposals in consortia mode.

- This is in alignment with the **objectives of the National Quantum Mission (NQM) to set up T-Hubs in Quantum Computing, Quantum Communication, Quantum Sensing & Metrology and Quantum Materials & Devices.**

- The NQM will also work in collaboration with **industry and startups** to translate research to deployable technologies.

- The initiative highlighted the spirit of collaboration in the mission could help make a meaningful **impact at the national and global level.**

About National Quantum Mission (NQM):

- **National Quantum Mission (NQM) launched on 19th April 2023**, is being implemented by **DST**.

- The mission is launched with a **total outlay of Rs.6003.65 Crore for a period of eight years.** The Mission aims to seed, nurture and scale up scientific and industrial R&D and create a vibrant & innovative ecosystem in **Quantum Technology (QT).**

- This will accelerate QT led economic growth, nurture the ecosystem in the country and make India one of the leading nations in the **development of Quantum Technologies & Applications (QTA).**

- The National Quantum Mission will focus on **developing magnetometers with high sensitivity** in atomic systems and Atomic Clocks for precision timing, communications, and navigation.

- The Mission would greatly benefit various sectors including **communication, health, financial, energy with applications in drug design, space, banking, security etc.**

- The Mission will also provide a huge boost to National priorities like **Digital India, Make in India, Skill India and Stand-up India, Start-up India, Self-reliant India and Sustainable Development Goals (SDG).**

Topic 5. IRAN LAUNCHES 'SORAYYA' SATELLITE INTO 750 KM ORBIT, ITS HIGHEST YET

Important for the subject: Science and Technology

Iran had conducted a successful satellite launch into its highest orbit.

- The launch was part of **Iran's Revolutionary Guards' space programme** alongside Iran's civilian space programme.
- The **U.S. intelligence community's 2023 worldwide threat assessment** said the development of satellite launch vehicles "shortens the timeline" for Iran to develop an intercontinental ballistic missile because it uses similar technology.

- **Iran is now producing uranium** close to weapons-grade levels after the collapse of its nuclear deal with world powers.

- Iran has enough **enriched uranium for "several" nuclear weapons**, if it chooses to produce them.

- Iran has sent **several short-lived satellites** into orbit and in **2013 launched a monkey into space.**

About Soraya satellite:

- The **Soraya satellite** was placed in an orbit at some **750 kilometers (460 miles)** above the Earth's surface with its **three-stage Qaem 100 rocket.** The satellite is built by the **elite military revolutionary guards.**

- The **Soraya satellite** was shot into orbit atop the **Ghaem-100 rocket** of **Iran's paramilitary Islamic Revolutionary Guard Corps (IRGC).**

About Intercontinental ballistic missile:

- An **Intercontinental ballistic missile (ICBM)** is a **ballistic missile** with a range greater than **5,500 kilometers (3,400 mi),** and is primarily designed for **nuclear weapons delivery.**

Intercontinental ballistic missiles can be used to deliver nuclear weapons.

- **The United States, Russia, China, France, India, the United Kingdom, Israel, and North Korea** are the only countries known to have operational ICBMs.

About India's ICBM:

- **Agni-V (Fire)** is a land based nuclear capable intercontinental ballistic missile ICBM.

- It is developed by the **Defence Research and Development Organisation (DRDO)** of India. The missile has a range of more than **7,000 kilometers.**

- It is a **three-stage, road-mobile, canisterised, solid-fueled intercontinental ballistic missile**.
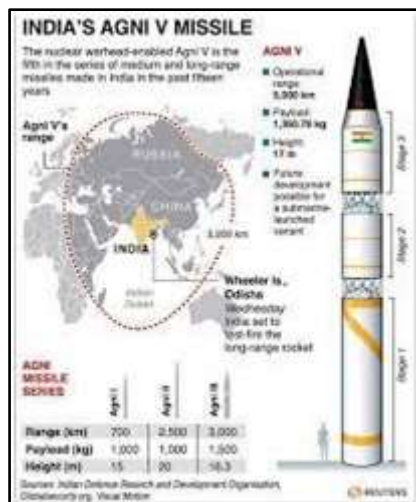
Topic 6. EITHER A MASSIVE NEUTRON STAR OR LOW-MASS BLACK HOLE FOUND

Important for the subject: Science and Technology
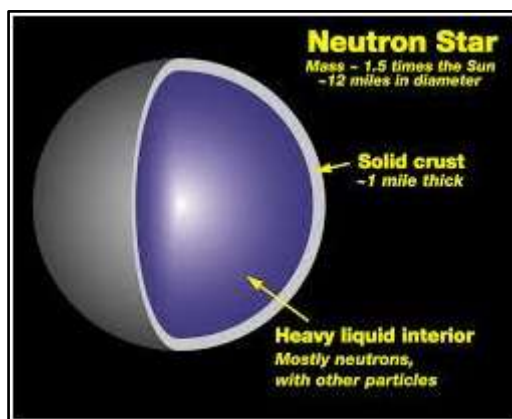
Researchers who used a telescope in **South Africa** reported the discovery of an **object in the Milky Way** that could **either be the most massive** — mass between 2.09 and 2.71 solar masses — **neutron star** ever observed, or the **least massive black hole.**

There is a substantial gap between the **masses of the heaviest measured neutron star** and the **lightest measured black hole** — the most massive neutron stars generally range between **2.2 to 2.5 solar masses,** while black holes of **less than 5 solar masses are rare**.

Neutron star:

- A neutron star is the **collapsed core of a massive supergiant star,** which had a total mass of between **10** and **25 solar masses (M☉),** possibly more if the star was especially metal-rich.

- Except for **black holes,neutron stars are the smallest and densest known class of stellar objects. Neutron stars** have a radius on the order of **10 kilometres (6 mi)** and a **mass** of about **1.4 M☉.**

- They result from the **supernova explosion of a massive star,** combined with **gravitational collapse,** that **compresses** the **core** past **white dwarf star density** to that of **atomic nuclei**.

- Once formed, neutron stars no longer actively generate heat and cool over time; however, they may still evolve further through collision or accretion.

Black hole:

- A black hole is a **region of spacetime** where **gravity is so strong that nothing, including light and other electromagnetic waves, has enough energy to escape it.**

- The **theory of general relativity** predicts that a sufficiently compact mass can deform spacetime to form a black hole. The **boundary of no escape** is called the **event horizon**.

- A black hole has a great effect on the fate and circumstances of an object crossing it, but **it has no locally detectable features** according to general relativity. In many ways, a black hole acts like an **ideal black body,** as it **reflects no light**.

- **Most black holes form from the remnants of a large star** that dies in a **supernova explosion.** (Smaller stars become dense neutron stars, which are not massive enough to trap light.)

Topic 7. JAPAN SAYS SPACECRAFT LANDS ON MOON, BECOMES WORLD'S 5TH COUNTRY TO DO SO

Important for the subject: Science and Technology

Japan became the **fifth country** in history to reach the moon when one of its spacecrafts without astronauts successfully made a soft landing on the lunar surface early Saturday.

- **Smart Lander for Investigating Moon (SLIM's)** small rovers were launched as planned and that data was being transmitted back to Earth.

- Japan follows the **United States, the Soviet Union, China and India in reaching the moon.**

- A landing of such precision would be a world's first and would be crucial technology for a sustainable, long-term and accurate space probe system.

About SLIM nicknamed as "the Moon Sniper":

- **SLIM was launched on a Mitsubishi Heavy H2**A rocket in September. It initially orbited Earth and entered lunar orbit **on Dec. 25.** SLIM is aiming to hit a **very small target**. It is a **lightweight spacecraft about the size of a passenger vehicle.**

- SLIM was carrying two small autonomous probes — **lunar excursion vehicles LEV-1 and LEV-2**. LEV-1 is equipped with an antenna and a camera an**d is tasked with recording SLIM's landing.**

- **LEV-2** is a ball-shaped rover equipped with two cameras, **developed by JAXA together with Sony, toymaker Tomy and Doshisha University.**

- It was using **"pinpoint landing" technology** that promises far greater control than any previous moon landing.

- Most previous probes have used landing zones about 10 kilometers (six miles) wide whereas SLIM was aiming at a target of just 100 meters (330 feet).

Other missions of Japan:

- **Hayabusa was a robotic spacecraft** developed by the Japan Aerospace Exploration Agency (JAXA) to return a sample of material from a small near-Earth asteroid named 25143 Itokawa to Earth for further analysis.

- **Hayabusa2 is an asteroid sample-return mission** operated by the Japanese state space agency JAXA. It is a successor to the Hayabusa mission, which returned asteroid samples for the first time in June 2010

- **The Artemis program is a Moon exploration progra**m that is led by the United States NASA and was formally established in 2017 via Space Policy Directive 1.

- **The Artemis program** is intended to reestablish a human presence on the Moon for the first time since Apollo 17 in 1972.
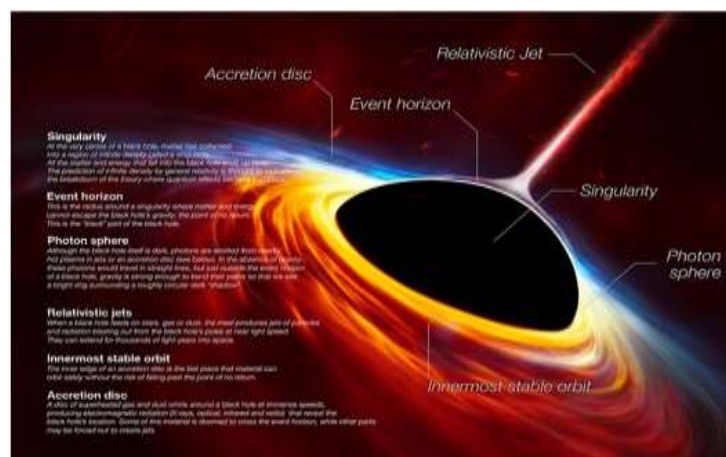
Topic 8. CHANDRAYAAN-3 LANDER VIKRAM IS NOW A LANDMARK ON MOON

Important for the subject: Science and Technology

Chandrayaan-3 lander Vikram is now firmly established as a landmark on the Moon. **A NASA spacecraft** which is currently orbiting the **Moon has sent laser beams** to a tiny mirror-based instrument on board Vikram.

- It has **successfully received the reflected beams**, verifying the possibility of a new way to precisely locate objects on the **Moon.**
- **NASA's Lunar Reconnaissance Orbiter (LRO)** performed the laser beam experiment on **December 12 last year.**
- The beams were made to bounce off the **Laser Retroreflector Array (LRA)**, a 2-inch wide dome-shaped instrument studded with eight finely-polished mirrors.
- The mirrors are oriented in such a way that they can tap and reflect light coming in from any direction. With this experiment **all the seven payloads on Vikram, and the two on Pragyaan rover**, have now been tested and verified to have functioned as designed.
- This is **not the first LRA to be deployed on the Moon** as such instruments were placed by the **Apollo** missions as well.
- One of these instruments revealed that the Moon was moving away from the **Earth by a rate of about 1.5 inches a year.**

About Laser Retroreflector Array (LRA):

- **Accommodated on Vikram as part of Chandrayaan3 mission**, the LRA comprises **eight retroreflectors on a hemispherical support structure.**
- This array **facilitates lasers ranging from various directions** by any orbiting spacecraft with suitable instruments.
- The **two-inch-wide LRA** is designed to last for decades on the lunar surface. It weighs only about **20 grams and does not require power** or maintenance.
- The instrument has **no electronics** and does **not need power or maintenance** and thus can remain useful for years, even decades. Since its **lunar landing,** Vikram has been

accessible for measurements from the altimeter on LRO, called LOLA.

- **LRA on Chandrayaan-3** is the **only one currently available** near the **lunar south pole** and its applications as a location marker would benefit current and future lunar missions.

- Measurements recorded using the LRA will help in the precise determination of the spacecraft's **orbital position** and reveal **insights into the moon's dynamics**, internal structure, and gravitational anomalies.

About Lunar Reconnaissance Orbiter (LRO):

- **The Lunar Reconnaissance Orbiter (LRO)** is a **NASA robotic spacecraft** currently orbiting the Moon in an eccentric polar mapping orbit.

- **Data collected by LRO** have been described as essential for planning **NASA's future human and robotic missions to the Moon.**

- LRO was the **first United States mission** to the Moon in over ten years. It was Launched on **June 18th 2009 in conjunction with the Lunar Crater Observation and Sensing Satellite (LCROSS).**

- **LRO and LCROSS** were launched as part of the **United States's Vision for Space Exploration program.**
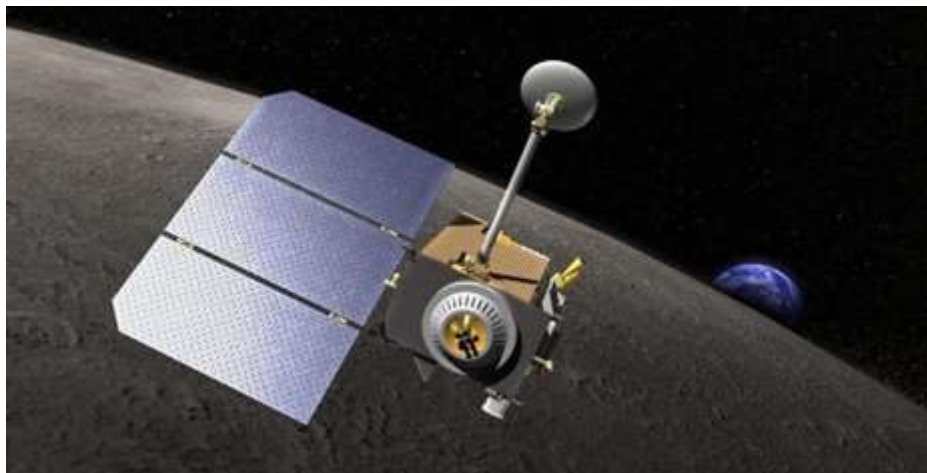
Topic 9. WHO RELEASES GUIDELINES FOR MULTI-MODAL GENERATIVE AI IN HEALTHCARE, RESONATES WITH RECOMMENDATIONS FOR OTHER SECTORS

Important for the subject: Science and Technology

The **World Health Organization (WHO)** has released **comprehensive guidance on the ethical use and governance of large multi-modal models (LMM) in healthcare**.

Large multi-modal models (LLM):

- **LMMs,** known for their ability to mimic human communication and perform tasks without explicit programming, have been adopted more rapidly than any other consumer technology in history.

- **Example:** ChatGPT, Bard, Bert and Gemini.

- **The risk from LLMs:** The generation of false, inaccurate or biased statements, which could misguide health decisions, the data used to train these models can suffer from quality or bias issues, potentially perpetuating disparities based on race, ethnicity, sex, gender identity or age, the accessibility and affordability of LMMs, and the risk of 'automation bias' in healthcare, leading professionals and patients to overlook errors, and cybersecurity.

About the Guidelines:

- The guiding document identified **five broad applications of LMMs in healthcare:** Diagnosis and clinical care, such as responding to patients' written queries; patient-guided use for investigating symptoms and treatments; clerical and administrative tasks in electronic health records; medical and nursing education with simulated patient encounters; and scientific research and drug development.

- For developers, the **WHO** advises engaging a wide range of stakeholders, including potential users and healthcare professionals, from the early stages of AI development. It also recommends **designing LMMs for well-defined tasks with the necessary accuracy and understanding of potential secondary outcomes**.

- It offers a **roadmap** for harnessing the power of **LMMs** in **healthcare** while navigating their complexities and ethical considerations. This initiative marks a significant step towards **ensuring that AI technologies serve the public interest, particularly in the health sector**.

- The **six core principles** identified by **WHO** are: (**1**) protect autonomy; (**2**) promote human well-being, human safety, and the public interest; (**3**) ensure transparency, explainability, and intelligibility; (**4**) foster responsibility and accountability; (**5**) ensure inclusiveness and equity; (**6**) promote AI that is responsive and sustainable.

- **WHO listed out concerns that called for rigorous oversight needed for the technologies to be used in safe, effective and ethical ways.**

These included:

- The data used to train AI may be biased, generating misleading or inaccurate information that could pose risks to health, equity and inclusiveness;

- Large language models (LLM) generate responses that can appear authoritative and

plausible to an end user; however, these responses may be completely incorrect or contain serious errors, especially for health-related responses;

- LLMs may be trained on data for which consent may not have been previously provided for such use, and LLMs may not protect sensitive data (including health data) that a user provides to an application to generate a response;

- LLMs can be misused to generate and disseminate highly convincing disinformation in the form of text, audio or video content that is difficult for the public to differentiate from reliable health content; and

- Policy-makers should ensure patient safety and protection while technology firms work to commercialise LLMs

Key recommendations for governments include:

- Investing in public infrastructure, like computing power and public datasets, that adhere to ethical principles

- Using laws and regulations to ensure LMMs meet ethical obligations and human rights standards

- Assigning regulatory agencies to assess and approve LMMs for healthcare use. Introducing mandatory post-release audits and impact assessments

Increased inequality due to generative AI:

- The **2024 World Economic Situation and Prospects report** indicates that while **AI's transformation of the labour market and productivity is underway**, there is a **concern** about its **unequal impact**.

- The report highlights a **global shift toward mass adoption of generative AI technologies,** such as **ChatGPT**, with a third of surveyed firms adopting it within six months.

- However, worries are expressed about **AI contributing to increased inequalities within and between countries**, potentially **diminishing the demand for low-skilled workers** and **adversely affecting disadvantaged groups,** particularly **women** in roles with higher automation risks.

- Additionally, challenges are emphasized for **workers in low-income developing countries,** who may experience **fewer job disruptions from automation** but are also **less likely to benefit from AI-driven productivity gains,** exacerbated by infrastructure gaps in digital education and internet access.

Disinformation and Misinformation:

- The **World Economic Forum's Global Risks Report** for **2024** highlights **AI-generated disinformation and misinformation,** particularly through **deep fakes**, as a major global

risk.

- The report expresses concerns about potential threats to the **legitimacy of newly elected governments,** especially during significant upcoming elections worldwide.

- In response to these concerns, the **European Union** passed the **AI Act** in **December, aiming** to **ensure the safe and ethical use of AI systems** within the EU while **respecting fundamental rights**.

- The report also identifies **quantum computing** as a potential **disruptor**, emphasizing security concerns related to **"harvest attacks"** on encrypted data for future decryption using advanced quantum computers.

Topic 10. GM CROPS WILL MAKE EDIBLE OIL CHEAPER: GOVT

Important for the subject: Science and Technology

The Supreme Court said it only wanted what was good for India even as the government argued that growing genetically modified (GM) crops such as mustard would make **quality edible oil cheaper** for the common man and benefit the national interest by reducing foreign dependence.

GM Crop

- Conventional plant breeding involves crossing species of the same genus to provide the offspring with the desired traits of both parents.

- **Genetic engineering aims to transcend the genus barrier by introducing an alien gene in the seeds to get the desired effects.**

- The alien gene could be from a plant, an animal or even a soil bacterium. E.g. **Bt cotton has alien genes from soil bacterium Bacillus thuringiensis (Bt).**

- It allows the crop to develop a protein, toxic to the common **pest pink bollworm. In Bt brinjal,** a gene allows the plant to resist attacks of fruit and shoot borer. Seeds produced using genetic engineering are called **Genetically Modified Seeds**

Legal position of genetically modified crops in India

- In India, the **Genetic Engineering Appraisal Committee (GEAC) is the apex body that allows for commercial release of GM crops.**

What is Genetic Engineering Appraisal Committee (GEAC)?

- It is responsible for the appraisal of activities involving large-scale use of hazardous microorganisms and recombinants in research and industrial production from the environmental angle.
- The committee is also responsible for the appraisal of proposals relating to the release of genetically engineered (GE) organisms and products into the environment including

experimental field trials.

- GEAC is chaired by the Special Secretary/Additional Secretary of MoEF & CC and co-chaired by a representative from the Department of Biotechnology (DBT). In 2002, the **GEAC had allowed the commercial release of Bt cotton**
- Use of the **unapproved GM variant can attract a jail term of 5 years and fine of Rs 1 lakh** under the **Environmental Protection Act, 1989.**

DMH-11

- DMH-11 is an indigenously developed transgenic mustard. It is a genetically modified variant of Herbicide Tolerant (HT) mustard.
- DMH-11 is a result of a cross between Indian mustard variety 'Varuna' and East European 'Early Heera-2' mustard.
- It contains two alien genes ('barnase' and 'barstar') isolated from a soil bacterium called Bacillus amyloliquefaciens that enable breeding of high-yielding commercial mustard hybrids.
- Barnase in Varuna induces a temporary sterility because of which it can't naturally self-pollinate. Barstar in Heera blocks the effect of barnase allowing seeds to be produced.
- DMH-11 has shown approximately 28% more yield than the national check and 37 % more than the zonal checks and its use has been claimed and approved by the GEAC. "Bar gene" maintains the genetic purity of hybrid seed.

Topic 11. HOW SATELLITES TRACK THE WEATHER

Important for the subject: Science and Technology

The **Indian Meteorological Department (IMD)** warned of "very dense fog" in several states, impacting visibility to less than 50 meters in some areas.

Types of Weather Satellites

- **Geostationary Satellites (GEO):** Orbit at an altitude of approximately **35,786 kilometers** above the equator, allowing them to remain stationary relative to a specific point on Earth. They provide continuous monitoring of a specific region, such as a continent or an ocean.
- **Polar Orbiting Satellites (PO):** Orbit the Earth from pole to pole, providing global coverage.
- They operate at lower altitudes (**typically 800-1,200 kilometers**) and are crucial for collecting detailed information about the atmosphere, including temperature, humidity, and cloud cover

India's Weather Satellites

- **INSAT 3D and 3DR** are currently active in geostationary orbits, aiding in weather

monitoring.

- India has a history of launching progressively advanced weather satellites, with each new version being an improved and better-equipped iteration of its predecessor

Instruments and Sensors

- **Visible and Infrared Sensors:** Capture images of clouds, land, and ocean surfaces. They help identify cloud cover, storm systems, and surface temperatures.

- **Microwave Sensors:** Penetrate clouds to measure temperature and humidity levels in different layers of the atmosphere.

- **Radiation and Energy Sensors:** Monitor incoming solar radiation and outgoing thermal radiation to study energy balance in the atmosphere.

- **Scatterometers:** Measure wind speed and direction over the ocean by analyzing the backscattered signals from ocean surfaces

Data Collection

- Satellites continuously collect data on various atmospheric parameters, including temperature, humidity, wind speed, cloud cover, and precipitation. This data is transmitted to ground stations, where it undergoes processing and analysis

Applications

- **Weather Forecasting:** Satellites provide real-time data that improves the accuracy of short-term and long-term weather forecasts.

- **Severe Weather Monitoring:** Satellites help track hurricanes, typhoons, tornadoes, and other severe weather events, allowing for early warnings and evacuation planning.

- **Climate Monitoring:** Long-term satellite data contribute to the study of climate patterns, climate change, and the Earth's overall climate system

Tracking Snow

- The **colour scheme** is designed to identify different cloud types, stages of thunderstorms, snow areas, and fire detection.

- Snow strongly absorbs radiation at 1.6 micrometers (shortwave infrared), causing the red component of the colour scheme to become weak when the satellite tracks snow

Night Microphysics

- Night microphysics involves the **difference between two signals to determine colors.** Red color is determined by the difference between two thermal infrared signals (12 micrometers and 10 micrometers).

- Green color varies based on the **difference between a thermal infrared signal and a middle infrared signal** (10.8 micrometers and 3.9 micrometers). Blue color is

determined by the strength of a thermal infrared signal at 10.8 micrometers

Applications of Color Scheme

- The color scheme helps **analyze cloud types, thunderstorm stages,** snow areas, and fire detection.

- By combining day and night microphysics data, scientists can **track moisture droplets, temperature differences, and cyclone formation, evolution, and depletion.**

Topic 12. DISTRESS ALERT TRANSMITTER (DAT)

Important for the subject: Science and Technology

Indian Space Research Organisation (ISRO) upgraded an distress alert transmitter (DAT) with advanced capabilities for fishermen at sea to send emergency messages from boats

About Distress alert transmitter (DAT)

- DAT is an **indigenous** technological solution for the **fishermen at sea to send emergency messages from fishing boats.**

- The messages are sent through a communication satellite and received at a central control station (**INMCC: Indian Mission Control Centre**) where the alert signals are decoded for the identity and location of the fishing boat.

- The extracted information is forwarded to **Maritime Rescue Co-ordination Centres** (MRCCs) under **Indian Coast Guard (ICG).** Using this information the MRCC co-ordinates to undertake Search and Rescue operations to save the fishermen at distress. The DAT is operational since 2010 and till now more than 20000 DATs are being used.

- Further, taking advantage of technological developments in satellite communication and satellite navigation ISRO has improvised DAT with advanced capabilities and features evolving to Second Generation DAT (DAT-SG).

Second Generation DAT (DAT-SG)

- **Space Applications Centre (ISRO)** has developed the Distress Alert Transmitter-Second Generation (DAT-SG) which is a UHF transmitter **based on NavIC receiver module.**

- This NavIC receiver module supports position determination as well as broadcast messages reception called NavIC messaging service.

- The end users are mainly fishermen of small boats who can use this device for emergency messages reporting with position information and the unit can also help them receive useful information like Potential Fishing Zone, weather alerts etc. as supported by NavIC messaging service

Features of Second Generation DAT (DAT-SG)

- The DAT-SG has the **facility to send back acknowledgement to the fishermen who activates the distress alert from sea**. This gives an **assurance of rescue coming.**

- Apart from transmitting distress signal from Sea, DAT-SG has the capability to receive messages from the control centre.

- Using this, advance alert messages can be sent to the fishermen at sea whenever there are events of bad weather, cyclone tsunami or any other emergencies. Thus, the fishermen will be able to sail back home or go to safe places.

- Information about **Potential Fishing Zones (PFZs) are also transmitted** to fishermen using DAT-SG on regular intervals. This helps fishermen to get good yield in the catch and savings in terms of time and fuel.

- DAT-SG can be connected to mobile phones using Bluetooth interface and the messages can be read in native language using an App in the mobile.

- The central control centre (INMCC) has a web based network management system called "**SAGARMITRA**" which maintains a **database** of registered DAT-SGs and helps MRCCs to access the information about boat, coordinate the boat in distress in real time.

- This helps the Indian Coast Guard to undertake Search & Rescue operations at the time of distress, without any time delay.

Topic 13. "CENTRE OF EXCELLENCE IN INTELLIGENT INTERNET OF THINGS SENSORS" AND "INDIA INNOVATION CENTRE FOR GRAPHENE"

Important for the subject: Science and Technology
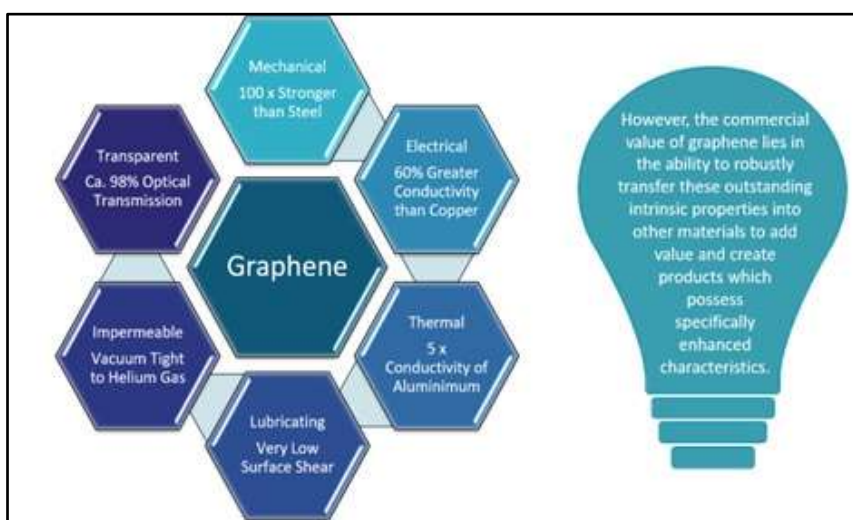
The Ministry of Electronics and Information Technology (MeitY) has launched the following two flagship programs from **Maker Village, Kochi, Kerala.** "Centre of Excellence (CoE) in Intelligent Internet of Things (IIoT) Sensors" and India's first Graphene Centre

"India Innovation Centre for Graphene (IICG).

The **CoE in IIoT Sensors** is a unique facility established at **Makers Village Kochi by MeitY.** The **India's first Graphene Centre IICG** also has been established at **Makers Village Kochi by MeitY.**

- **Digital University Kerala (DUK) (formerly IIITMK) and Centre for Materials for Electronics Technology (CMET)-Thrissur** are the technical partners for setting up these centers at Makers Village Kochi.

- The c**omplete full-fledged facility for R&D, incubation, innovation, skilling, capacity building, testing & certification** shall be established at these centers by the experts of these agencies.

- **Shri S Krishnan has also launched Hardtech 2024, Maker Village's annual flagship programme.**

- The programme aims to **bring together leaders from Industries, Startups, Investors, Academia, R&D organizations** in the field of electronics hardware design and manufacturing

About CoE in IIoT Sensors:

- The CoE in **IIoT Sensors aims to catalyze the development of sensors** within the realm of Intelligent IoT systems.

- It will cover a **broad spectrum of applications of intelligent sensors** in networks, devices and sensor systems

About India's first Graphene Centre IICG:

- The **India's first Graphene Centre IICG** also has been established at **Makers Village Kochi by MeitY, GoI and Govt. of Kerala alongwith Tata Steel Limited.**

- It aims to **foster R&D, product innovation and capacity building** in the area of Graphene and 2D material systems.

Importance of the initiative:

- IIoT sensors and Graphene technologies will help in **driving digital transformation and economic growth.**

- One of the main objective of setting up these centers in the **country is creation of complete ecosystem for start-ups in the area of IoT Sensors and Graphene & 2D Materials**

About Graphene:

- Graphene is an **allotrope of carbon consisting of a single layer** of atoms arranged in a hexagonal lattice nanostructure.

- It is considered to be the **world's thinnest, strongest and most conductive** material for both electricity and heat.

- It is **harder than diamond yet more elastic than rubbe**r; tougher than steel yet lighter than aluminum. **Graphene** is the strongest known material

Other Properties of Graphene are:

1. Lowest resistivity substance known at room temperature.

2. High thermal stability.

3. High elasticity.

4. High electrical conductivity.

5. Electron mobility is high at room temperature.

6. Graphene oxide (GO) membranes can be used to filter common salt from seawater.

Topic 14. WHAT ARE LIGHT-EMITTING DIODES AND WHY ARE THEY PRIZED AS LIGHT SOURCES?

Important for the subject: Science and Technology

What are diodes?

A **diode** is a **small electronic component** with **two terminals,** an **anode** and a **cathode,** designed to allow **current flow in only one direction**.

- It operates based on a **p-n junction,** where a **p-type material** with **positive charge carriers (holes)** meets an **n-type material** with **negative charge carriers** (electrons).
- This junction allows electrons to move easily from the **n-type** to the **p-type material**, creating a **one-way current flow.**

- The **anode** is connected to the **p-type material,** and the **cathode** is connected to the **n-type material.** Initially, some electrons move from the **n-side** to the **p-side,** creating a layer between them without **free electrons or holes**.

- When a suitable **voltage** is applied, **more electrons flow from the n-side to the p-side**, allowing current to move from the **anode** to the **cathode.** However, if the **voltage is reversed,** the **current won't flow in the opposite direction.**

What is an LED?

- An **LED,** or **Light-Emitting Diode,** is a type of diode that **emits light** through a process called **electroluminescence.**

- Within the **diode's p-n junction,** when **electrons with higher energy levels** meet and

fill **holes**, they **release energy** in the **form of light**.

- The visible light emitted depends on the **frequency** of this energy. The phenomenon is regulated by the **band gap**, ensuring that the emitted light falls within the visible part of the electromagnetic spectrum.

What is called the Band Gap?

- The **band gap** is a **characteristic** of **materials,** representing the **energy difference** between the **lower** and **higher energy levels** that electrons can occupy.

- In **conductive materials,electrons flow freely** when energized by an **electric field**, while **insulators prevent electron flow** due to **insufficient energy.**

- The **band gap** is the **energy barrier electrons must overcome to conduct current.** In **LEDs,** the energy released during **electron-hole recombination** corresponds to the **band gap**.

- Engineers can tailor the band gap of the **p-n junction** in **LEDs** by selecting specific materials, allowing for the **emission of visible light** when an **electric current** is applied.

What colours can an LED produce?

- **LEDs** can produce **all three primary colours—red, green,** and **blue**—allowing for a **diverse range of colours** when combined.

- However, the development of **blue LEDs** faced challenges, as **scientists struggled to create crystals of gallium nitride,** a compound capable of emitting **blue light**, with the required properties.

- Breakthroughs in **epitaxy,** a layer-by-layer material-building process, led to the invention of **bright blue LEDs** in the late **1980s.Three Japanese researchers**, **Isamu Akasaki, Hiroshi Amano,** and **Shuji Nakamura,** received the **2014 Nobel Prize in Physics** for their significant contributions to this achievement.

Advantages of LED lights:

- The advantages of LEDs, in line with **Haitz's law,** include a **substantial decrease in cost** and a **significant increase in light output** for a given frequency of light.

- Even before **Haitz's law,LEDs** were valued for their **efficiency** compared to **incandescent bulbs** and **fluorescent lamps**.

- Their **durability, light contrast,** and **energy efficiency** contribute to **cost savings** and **reduced material waste.**

Applications of LED lights:

- LEDs find **applications** in various fields, from **consumer electronics** like **smartphones** and **TV screens** to **industrial uses** such as **signboards,**

greenhouse lighting for plants, barcode scanners, and **air quality monitoring.**

- **Modern LEDs** can produce **different colours,** operate at various frequencies, and be **embedded in the skin,** and **organic LEDs** offer **enhanced light emission**. Ongoing research explores more efficient LEDs using materials like **perovskites**.

Topic 15. BIOLOGICAL E'S CORBEVAX BAGS EMERGENCY USE LISTING FROM WHO

Important for the subject: Science and Technology

The **World Health Organization (WHO)** has granted an **Emergency Use Listing (EUL)** to **Biological E Ltd's (BE) Covid vaccine, Corbevax**. The **Hyderabad-based** vaccine-maker's **Corbevax** is **India's first indigenously developed COVID-19 vaccine** based on a **protein sub-unit platform**.

- The **Drugs Controller General of India (DCGI)** approved **Corbevax** for **restricted use** in **emergencies** among **adults, adolescents** and **young children** in a sequential manner from December 2021 to April 2022 as well as **India's first heterologous Covid booster shot** for **adults** aged **18 and above** in June 22.

- The **Corbevax vaccine** is administered through the **intramuscular route** with **two doses** scheduled **28 days apart** and is stored at **2 to 8 degrees Celsius** temperature and presented as 0.5 ml (single dose) vial, 5 ml (10 doses) vial and 10 mL (20 doses) vial pack.

- **BE** has been working on a **next-generation Covid vaccine** based on the **XBB1.5 variant** of the **SARS-CoV-2 virus,** which would conform to **WHO TAG-CO-VAC recommendations**.

Corbevax development:

- **Corbevax,** an **indigenously produced vaccine, originated** from the **Baylor College of Medicine's National School of Tropical Medicine**.

- Leveraging a decade of experience in developing recombinant protein vaccines for coronaviruses **SARS** and **MERS**, researchers at the School used the **genetic sequence of SARS-CoV-2**, specifically the **spike protein gene,** made available in February 2020.

- The **gene** was **cloned** and **engineered**, then inserted into **yeast** to produce and release **copies of the protein**, similar to beer production. After purification to eliminate yeast remnants, the vaccine was formulated using an **adjuvant** to enhance the **immune response**.

- These **cost-effective** and **readily available ingredients** contributed to the **vaccine's affordability.**

How Corbevax works?

- **Corbevax** is a **recombinant protein sub-unit vaccine** designed to target a specific part

of the **SARS-CoV-2 virus,** namely the **spike protein** on its surface.

- The **spike protein** is essential for the **virus** to **enter cells and cause infection.** By introducing only this protein to the body, the vaccine triggers an **immune response** without the presence of the entire virus.

- This **immune response** prepares the body to **defend against the virus** if it attempts to infect, reducing the likelihood of severe illness.

- While this technology has been used for decades in **hepatitis B vaccines, Corbevax** represents one of the early **Covid-19 vaccines** employing this approach, with **Novavax** also developing a **protein-based vaccine** awaiting **emergency use authorization** from regulatory bodies.

How Corbevax is different?

- Corbevax stands out from other approved Covid-19 vaccines by **using a different approach**. While vaccines like **Pfizer** and **Moderna** are **mRNA-based,AstraZeneca-Oxford/Covishield, Johnson & Johnson,** and **Sputnik V** are **viral vector vaccines,** and **Covaxin, Sinovac-CoronaVac,** and **Sinopharm's vaccines** are **inactivated vaccines (include killed particles of the whole SARS-CoV-2 virus),Corbevax** is a **recombinant protein sub-unit vaccine**.

- Unlike inactivated vaccines that target the entire virus structure, **Corbevax,** similar to **mRNA** and **viral vector vaccines**, focuses on the **spike protein**.

- However, **Corbevax** introduces the **spike protein directly** rather than instructing cells to produce it.

- Despite being administered in **two doses** like many other Covid-19 vaccines, **Corbevax** is expected to be among the **cheapest options** due to its **low-cost production platform**.

Emergency Use Listing (EUL) of WHO:

- The **WHO Emergency Use Listing Procedure (EUL)** is a **risk-based assessment process** designed to **evaluate and list unlicensed vaccines, therapeutics,** and **in vitro diagnostics,** expediting their availability during public health emergencies.

- It aids **UN procurement agencies** and **Member States** in determining the suitability of specific products based on **essential quality, safety, efficacy,** and **performance data.**

- The procedure covers **three product streams (vaccines, therapeutics, and in vitro diagnostics)** with **specific eligibility criteria**.

- These **include** the severity and immediacy of the targeted disease, the absence of licensed products, compliance with Good Manufacturing Practices (GMP) or Quality Management System (QMS), and the commitment to complete product development and seek WHO prequalification once licensed.

Topic 16. ICMR STARTS REVISING CURRENT NATIONAL ESSENTIAL DIAGNOSTICS LIST FOR FIRST TIME

Important for the subject: Science and Technology

The Indian Council of Medical Research (ICMR) has begun the process of revising the current National Essential Diagnostics List (NEDL), saying that considerable time has passed **since the first list was released in 2019.**

- The World Health Organisation (**WHO) released the first edition of essential diagnostics list (EDL) in May 2018**. Even though WHO's EDL acts as a **reference point** for development of **national EDL (NEDL)**, India's diagnostics list has been customised and prepared as per landscape of India's health care priorities.

- In **India**, diagnostics are regulated under the regulatory provisions of the **Medical Device Rules, 2017.**

- Diagnostics (medical devices and in vitro diagnostics) follow a regulatory framework based on the drug regulations under the **Drugs and Cosmetics Act, 1940 and Drugs and Cosmetics Rules 1945.**

National Essential Diagnostic List

- **Level of Healthcare:** NEDL has been developed for all levels of health care – **village level, primary, secondary and tertiary care.**

- It builds upon the **Free Diagnostics Service Initiative (FDI)** and other diagnostics initiatives of the Health Ministry to provide an expanded basket of tests at different levels of the public health system.

- FDI was launched in July 2015. Under this initiative, the **National Health Mission (NHM)** is supporting all states to provide essential diagnostics – laboratory and radiology at their public health facilities, free of cost.

- **Scope:** It includes a group of **general laboratory tests** for routine patient care and for diagnosis of communicable and non- communicable diseases.

Indian Council of Medical Research

- The Indian Council of Medical Research (ICMR), New Delhi, is the apex body in the country for the formulation, coordination and promotion of biomedical research. It is one of the oldest medical research bodies in the world.

- As early as in 1911, the then Government of India set up the Indian Research Fund

Association (IRFA) with the specific objective of sponsoring and coordinating medical research in the country.

- After independence, several important changes were made in the organisation and the activities of the IRFA. It was redesignated in 1949 as the Indian Council of Medical Research (ICMR) with considerably expanded scope of functions. The ICMR is funded by the Government of India through the Ministry of Health & Family Welfare.

Topic 17.   AI-LED ROBOTIC LAB DEVELOPS ENZYME TO WITHSTAND HIGHER TEMPERATURES WITHOUT HUMAN INTERVENTION. HOW IT WORKS

Important for the subject: Science and Technology

Scientists from the **University of Wisconsin–Madison** have developed a **metabolic protein** that can **withstand higher temperatures** using an **autonomous robotics lab** driven by **artificial intelligence (AI)**.

About SAMPLE (self-driving autonomous machines for protein landscape exploration):

- The platform, named **SAMPLE,** operates as a **fully autonomous system**, learning **protein sequence-function relationships** through **AI**.It designs **new proteins** on paper, instructs robotic instruments to create them, and tests their functionality.

- In an experiment focused on **glycoside hydrolase proteins, SAMPLE** produced versions that could function at **temperatures 12 degrees Celsius higher than the starting proteins,** a task that would take a human about a year.

- While **SAMPLE** enhances efficiency in protein engineering, human expertise remains crucial in designing hypotheses and interpreting findings.

Protein engineering:

- Protein engineering is a field with vast potential, touching diverse areas such as **medicine, energy** and **chemistry**

- However, **traditional methods** of creating proteins with new or improved functions are notoriously **slow**, demanding and inefficient.

- The process typically involves **generating hypotheses, designing** and **conducting experiments,** and **interpreting results** — a cycle that is both labour-intensive and time-consuming.

Topic 18. WHAT ARE ECOLOGICAL DROUGHTS?

Important for the subject: Geography

Drought impact in India:

India has reported a drought at least **once every three years** in the **last five decades**. It has **lost** between **two and five per cent** of its **GDP** due to the **impacts of drought,** according to a **2022 report** from the **United Nations Convention on Combating Desertification (UNCCD)**, which also included a **global drought index** that compared **India's drought vulnerability** to that of **sub-Saharan Africa**.

How are droughts defined in India?

- **India** identifies **three types of droughts:** **meteorological, hydrological,** and **agricultural.**

- **Meteorological Drought:** This occurs when there is a **significant shortfall in precipitation compared to the long-term average for a specific period.**

- The **India Meteorological Department** defines a **meteorological drought** when **seasonal rainfall is less than 75% of its long-term average.** It's classified as **moderate** if the **deficit is between 26-50%** and **severe** if it **exceeds 50%.**

- **Hydrological Drought:** Defined by **low water levels** in **surface and sub-surface sources** like **streams, reservoirs**, and These droughts can occur even with **average or above-average precipitation** if water usage depletes reserves.

- **Agricultural Drought:** This happens when a **meteorological drought lasts for at least four weeks,** leading to **reduced soil moisture and vegetation.**

- Signs include **distress in agricultural communities,** such as **cattle sales, fodder shortages, migration, limited drinking water, increased demand for labor,** and **rising commodity prices.**

- For a **state** in **India** to **officially declare a drought,** it must **meet certain criteria** outlined in the **Drought Manual of 2016.** These **criteria** include **rainfall deficit, dry spell duration, soil moisture, sown area, vegetation health** (via remote sensing), **reservoir and groundwater levels, stream flow,** and **socio-economic impacts.**

Ecological drought:

- **Ecological drought** is **distinct from other drought types** in its **focus** on the **interconnectedness between humans and ecosystems** within the context of drought.

- Defined as an **episodic water deficit** that **pushes ecosystems beyond vulnerability thresholds, ecological drought** affects **ecosystem services** and **triggers feedback** in both **natural** and **human systems.**

- This concept emphasizes the **ripple effect** caused by **changes in an ecosystem** due to **drought,** impacting communities dependent on those ecosystems for essential goods and services.

- Studies in the **Western Ghats** have shown that **persistent water deficits can distress certain tree species** and **alter their geographic distribution,** affecting species persistence, diversity, and ecosystem function. **Drought** is also increasingly **linked to wildfires** in the region.

- The **2016 Drought Manual in India** acknowledges **drought's environmental effects,** like **loss of forest cover, increased wildlife migration** and **human-animal conflicts.** However, it **doesn't include specific indicators** for **monitoring** or **assessing ecological drought.**

Topic 19. RARE EARTH METALS MAY BE LURKING IN YOUR JUNK DRAWER

Important for the subject: Geography

WHERE ARE THE WORLD'S LARGEST
RARE EARTH RESERVES
Reserves in metric tonnes of REO (rare earth oxides) as of 2020

World total	12,00,00,000
China	4,40,00,000
Vietnam	2,20,00,000
Brazil	2,10,00,000
Russia	1,20,00,000
India	69,00,000
Australia	41,00,000
Greenland	15,00,000
United States	15,00,000
Tanzania	8,90,000
Canada	8,30,000
South Africa	7,90,000
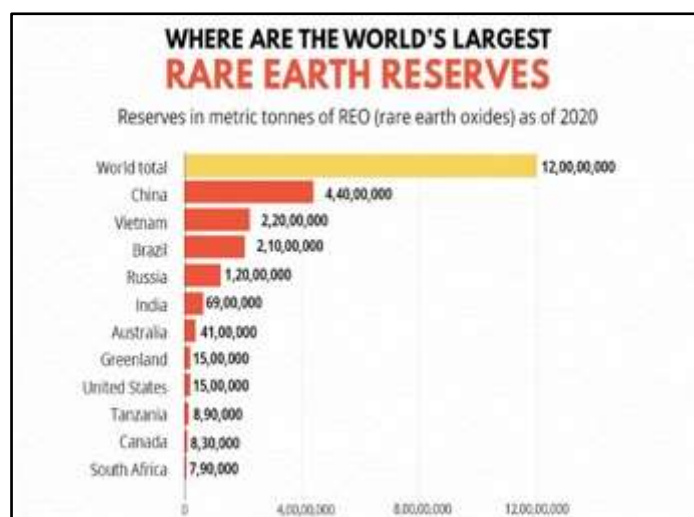
Studies from **China and the Netherlands** reveal that reusing or recycling rare earth metals could meet as much as 40 percent of the demand for the metals in the United States, China and Europe by 2050.

- Only about **1 percent of rare earth metals** in old electronic products are currently reused or recycled, researchers estimate. A vast and largely overlooked source of rare earth metals could be in our homes, sitting in the back of our cabinets and junk drawers.

- It is estimated that **reusing or recycling these rare earth metals** from old cell phones, hard drives, electric motors and turbines could meet as much as 40 percent of the demand for the metals in the **United States, China and Europe by 2050.**

- The **United States relies heavily on imports** of these materials which are called rare earths, making American supply chains vulnerable to disruption and geopolitical risks.

- The scientists found that the United States, the European Union and Japan could accumulate rare-earth stockpiles in their old electronics and other products that will far exceed what they would find mining the earth.

- Companies like **Apple are developing robots** that help to recover critical materials, including rare earths, from old iPhones.

About Rare Earths:

- **Rare Earths are a set of 17 chemical elements** in the periodic table, specifically the 15 lanthanides plus scandium (Atomic Number 21) and Yttrium (Atomic Number 39).

- This **Lanthanide series comprises the 15 metallic chemical elements** with atomic numbers 57 to 71 i.e. from **lanthanum through lutetium.**

- **Scandium and yttrium are considered rare-earth elements** because they tend to occur in the same ore deposits as the lanthanides and exhibit similar chemical properties, but have different electronic and magnetic properties.

Cerium (AN 58) is the most abundant rare earth metal.

- Their color ranges from **Shiny Silver to Iron Gray.** They are soft, malleable, ductile and usually reactive, especially at elevated temperatures or when finely divided.

Rare Earths in India:

- The Rare Earth (RE) resources in India are reported to be the **fifth largest in the world.** Indian resources contain **Light Rare Earth Elements (LREE) while Heavy Rare Earth Elements (HREE)** are not available in extractable quantities.

- 07 million tonnes in-situ monazite (containing ~55-60% total Rare Earth Elements oxide) resource occurring in the coastal beach placer sands in parts of **Kerala, Tamil Nadu, Odisha, Andhra Pradesh, Maharashtra and Gujarat and in the inland placers in parts of Jharkhand, West Bengal and Tamil Nadu.**

- In Indian deposits**, only Neodymium and Praseodymium** are available and are being extracted up to 99.9 % purity level.

Applications of Rare Earths:

- Rare earths are essential for green technology, like electric vehicles and wind turbines. They have a critical role in moving the world away from burning fossil fuels. They are also used in industries like aircraft, missile and satellite manufacturing.

Recycling of rare earths:

- **Reusing and recycling rare earths can cut down on the need for mining**, which can pollute soil and water with toxic heavy metals like arsenic.

- Being able to tap already-mined rare earths would be another advantage of switching to

renewable energy from burning fossil fuels, which drives global warming.

- Unlike **fossil fuels, which are 'burnt out' and permanently lost once consumed**, the **rare earths** can be 'recovered' as alternative supply.

- In the 1980s, Japanese researchers coined the term urban mining to describe collecting rare metals from discarded appliances and electronic devices, rather than from the earth.

- Common metals like iron, copper and aluminum are already widely recycled. **Only about 1 percent of rare earths** in old products are reused or recycled

- The world instead relies on mining for its supply of rare earths, about 70 percent of which comes from China.

Challenges in rare earth recycling:

- **Rare earths are often combined with other metals**, so extracting them can be difficult. Some **rare-earth recycling methods require hazardous chemicals** and lots of energy.

- Extracting the few grams, or even milligrams, of rare earths that are present in each old product can be a **daunting task.**

Topic 20. URBANISATION IN BHUBANESHWAR IMPACTS WINTER TEMPERATURES

Important for the subject: Geography

Bhubaneswar, a **tier-II city** in **Odisha**, exemplifies **rapid urbanization** and **warming trends,** with a **166% increase** in **built-up area** from **2004-2015** and a **0.68C temperature rise** in the last two decades, especially pronounced in newly urbanized peripheries.

- The ministerial meeting at **COP-28** emphasized the **crucial role of cities in achieving climate change mitigation and adaptation goals**.

- Despite **cities contributing over 80% to the global GDP** and **75% of greenhouse gas emissions,** their representation in climate action plans is insufficient.

- Recent developments, such as the inclusion of the **11th Sustainable Development Goal** exclusively focusing on cities and the **formation of groups** like **U-20,** highlight the recognition of the importance of **city-level action plans**.

Local activities:

- In the implementation of a **digital twin** for **Bhubaneswar** at **IIT Bhubaneswar,** computer simulations were conducted to analyze **urban growth** and **micro-climate changes.**

- Results indicate that nearly **60%** of the **city's observed warming** is attributed to **local activities**. Additional warming arises from **heat-trapping materials (concrete and**

asphalt) in **urban construction** and **decreased evapotranspiration** due to artificial surfaces.

- The simulations revealed a **0.4°C** enhanced warming in the **eastern lowland regions during winter,** influenced by **topography** and **reduced wind speeds.**

- **Urban development's impact on winter surface temperatures** underscores the intricate relationship between **urbanization** and **climate**.

- These changes are expected to affect **rainfall patterns, intensify urban floods,** and **alter air pollution dispersion**.

- The digital twin facilitates experimenting with mitigation strategies like **cool roofs** and **green infrastructure,** emphasizing the importance of **local-scale efforts** in addressing observed warming and its consequences

Amplifying factors:

- The **increasing population and reliance on city resources** pose ongoing challenges, emphasizing the need for **science-driven strategies** to address **vulnerabilities in cities**.

- Building **climate-resilient smart cities** is crucial for ensuring the well-being of the growing urban population.

Topic 21. SCIENTISTS MAP LARGEST DEEP-SEA CORAL REEF OFF ATLANTIC COAST

Important for the subject: Geography

For the first time, **scientists have succeeded in mapping the largest deep-sea coral reef** in the world, which runs hundreds of miles off the Atlantic coast of the United States.

According to the **National Oceanic and Atmospheric Administration (NOAA), this massive 6.4-million-acre reef** is bigger than the state of Vermont. It is evident that larger

deep-sea reefs will be discovered in the future since only about **75% of the world's ocean floor** has been mapped in high-resolution.

Only **50% of US offshore** waters have been mapped. **Both deep-sea coral reefs and tropical reefs are at risk** from oil and gas extraction and climate change.

About the reef:

- The reef extends for about **310 miles (499 kilometers) from Florida to South Carolina and at some points reaches 68 miles (109 kilometers) wide**. The total area is nearly three times the size of **Yellowstone National Park.**

- The reef was found at depths ranging from 655 feet to 3,280 feet (200 meters to 1,000 meters), where sunlight doesn't penetrate and waters are an average of 39 degrees Fahrenheit.

- Scientists nicknamed the largest area of the reef **"Million Mounds."** It is made up mostly of **stony corals. Cold-water corals** such as these grow in the deep ocean where there is no sunlight and survive by **filter-feeding biological particles**.

- **Cold-water corals are known to be important ecosystem** engineers, creating structures that provide shelter, food, and nursery habitat to other invertebrates and fish, these corals remain poorly understood

- For **tropical coral reefs, photosynthesis** is important for growth. However, for corals this far down, **must filter food particles** out of the water for energy.

- **Deep coral reefs** provide habitat for sharks, swordfish, sea stars, octopus, shrimp and many other kinds of fish. **Deep reefs cover more of the ocean floor than tropical reefs.**

About coral reefs:

- **Coral reefs** are some of the most diverse ecosystems in the world. Vibrant and healthy reefs form when a coral and **an algae — zooxanthellae — start a symbiotic relationship.**

- The **coral provides protection and compounds zooxanthellae's need for photosynthesis**. The **algae produces carbohydrates and helps remove the coral's waste.**

- C**oral polyps, the animals primarily responsible for building reefs**, can take many forms: large reef building colonies, graceful flowing fans, and even small, solitary organisms.

- The **Great Barrier Reef in Australia is the world's largest tropical coral reef** system which stretches for about 1,430 miles (2,301 kilometers).

About Coral Bleaching:

- Warmer water temperatures can result in **coral bleaching.**

- When water is too warm, **corals expel the algae (zooxanthellae) living** in their tissues causing the coral to turn completely white.

- This is called **coral bleaching.** When a coral bleaches, it is not dead.

Some reefs in news:

- **Ren'Ai reef** is located in the South China sea.

- **Ren'Ai reef** is the Chinese name for what the Philippines call Ayungin Shoal and the US calls the Second Thomas Shoal, the site of multiple confrontations between the two countries' ships in recent months.

- **Mischief reef** is located in the South China Sea.

- **Conway reef** is located in the Pacific Ocean.

- **Lyra reef** is located in the Pacific Ocean.

Topic 22. WARMER WINTER IMPACTS ICE HOCKEY, CHADAR TREK IN COUNTRY'S COLDEST REGION OF LADAKH

Important for the subject: Geography

Unusually warm weather in **Ladakh** this winter has affected **extreme winter sports** like **ice hockey** and the **105-kilometre Chadar trek**.

- In **Ladakh's Kargil town, ice hockey rinks** faced challenges in forming a proper ice surface, prompting the **use of electric fans to maintain safe playing conditions.**

- The **warmer temperatures,** deviating from the normal pattern by **four to eight degrees,** also impacted the **Chadar trek,** causing a delay in its start and a shorter route due to late ice formation on the **Zanskar River.**

- The **Chadar trek** is one of the **extreme sports in the country** and is held only when the temperature drops between **-30 to -35 degrees**.

- The usual extreme conditions required for these activities were not met due to the warmer and deficient snowfall months of November and December.

About Chadar trek:

- The **Chadar Trek** or the **Zanskar Gorge Trek** is a winter trail over the **frozen Zanskar River,** which lies in the **Indian Union territory of Ladakh.**

- It is traditionally the **only means of travel** in the area during the harsh winter months. The trail has become popular with foreign adventure tourists.

- The **walls are near vertical cliffs** up to **600 m high** and the **Zanskar River** (a tributary of the **Indus)** flows in a **narrow gorge** that is **only 5 metres** (16 ft) wide in places.

- The overall distance is approximately **105 kilometres (65 mi)** – an average trekker walks **16 kilometres** (10 mi) per day.

Zanskar River:

- It is the **first major tributary** of the **Indus River,** equal or greater in volume than the main river, which **flows entirely within Ladakh, India.**

- It **originates northeast of the Great Himalayan range** and drains both the **Himalayas** and the **Zanskar Range** within the region of **Zanskar.**

- It flows **northeast** to join the **Indus River** near **Nimo.**

Topic 23. 13% OF LAND MASS IN KERALA VULNERABLE TO LANDSLIPS

Important for the subject: Geography

An artificial intelligence based map of Kerala has revealed that 13% of the land mass is extremely vulnerable to landslips, forming part of a multifaceted crisis gripping the region.

- The vulnerability map, prepared under the aegis of Kerala University of Fisheries and Ocean Studies, is the **first AI based landslip susceptibility map.**

What is a Landslip/Landslide?

- A landslide is a geological phenomenon involving the **downward movement of a mass** of rock, soil, and debris on a slope. This movement can vary in scale from small, localized shifts to massive and destructive events.

- Landslides can occur on **both natural and man-made slopes,** and they are often triggered by a combination of factors such as heavy rainfall, earthquakes, volcanic activity, human activities (such as construction or mining), and changes in groundwater levels

Reasons behind Landslides in Himalayan region

- **Fragile Ecosystem:** Tectonic or neo-tectonic activities, associated with numerous subsurface processes like rock deformation, exhumation and reworking of rocks and surface processes such as erosion, weathering and rain/snow precipitation make the ecosystem inherently fragile.

- **Earthquakes:** The convergence of the Indian plate with the Eurasian plate in the Himalayan region has created subterranean stresses that get released in the form of earthquakes which, in turn, cause fractures and loosen the litho-structures near the mountain surface. This increases the possibilities of rock movement along the slope.

- **Climate Induced Excessive Events:** Climate-induced excessive events like freezing/thawing and heavy rain/snow precipitation lead to avalanches, landslides, debris flow, glacial lakes outburst floods, landslide lakes outburst floods and flash floods.

- **Anthropogenic Factors:** Human activities such as **road construction, tunneling, mining, quarrying, deforestation, urbanization, agriculture, excessive tourism and hydroelectric projects** can also cause or worsen landslides in the Himalayas.

- These activities can disturb the natural balance of the slopes by removing vegetation cover, altering drainage patterns, increasing soil erosion, creating artificial cuts and fills, blasting rocks, and generating vibrations.

- **Geological Composition:** Some of the Himalayan rocks are made of limestone, which is

more prone to water and landslides than other types of rocks because it can dissolve in weakly acidic rainwater or groundwater.

- **This process creates caves, sinkholes, and other karst features that weaken the stability of the slopes.**

- **Westerly Disturbance & Monsoon:** Confluence of Westerly Disturbance — a low-pressure system, originating from the Mediterranean Sea, moving eastward across central Asia and northern India — and the South West Indian Summer Monsoon cause excessive and concentrated rainfall in parts of J&K, Himachal Pradesh and Uttarakhand leading to landslides and flash floods.

What are the Initiatives taken by the Government to mitigate the risk of landslides?

- **National Landslide Risk Management Strategy (2019):** This is a comprehensive document that addresses all the components of landslide disaster risk reduction and management, such as hazard mapping, monitoring, early warning system, awareness programs, capacity building, training, regulations, policies, stabilization and mitigation of landslides, etc.

- **Landslide Risk Mitigation Scheme (LRMS):** This is a scheme under preparation that envisages financial support for site specific landslide mitigation projects recommended by landslide prone states, covering disaster prevention strategy, disaster mitigation and R&D in monitoring of critical landslides, thereby leading to the development of early warning system and capacity building initiatives.

- **Flood Risk Mitigation Scheme (FRMS):** This is another scheme under preparation that covers activities like pilot projects for development of model multi-purpose flood shelters and development of river basin specific flood early warning system and digital elevation maps for preparation of inundation models for giving early warning to the villagers for evacuation in case of flood.

- **National Guidelines on Landslides and Snow Avalanches:** These are guidelines **prepared by the National Disaster Management Authority (NDMA)** to guide the activities envisaged for mitigating the risk emanating from landslides at all levels.

- **Landslide Atlas of India:** The Landslide Atlas of India is a document that provides the details of landslides present in landslide provinces of India, including damage assessment of specific landslide locations. It is prepared by the **National Remote Sensing Centre (NRSC),** one of the centers of ISRO.

Topic 24. ON DELISTING SOME KUKI-ZOMI TRIBES

Important for the subject: Geography

The **Manipur Government** has been asked by the **Centre** to examine a representation seeking the delisting of certain **Kuki and Zomi tribes** from the **Scheduled Tribes (ST)**

list of **Manipur**

What led to the representation?

- The **representation** to **de-schedule** certain **Kuki and Zomi tribes** in **Manipur** is a response to the ongoing **ethnic conflict** between the **valley-based Meitei people** and the **hills-based Kuki-Zo (ST) people**.

- The **Meiteis,** who seek **ST status to own land in forested hill districts** where **only STs can own land,** argue against the inclusion of certain **Kuki and Zomi tribes** on the list.

- This marks the **first instance** of the **Meitei community** challenging the **ST status** of other tribes, potentially **influencing the criteria for defining STs set in 1965**

What does the representation say?

- The representation by **Mr Thounaojam** (National Secretary of the Republican Party of India (Athawale) in Manipur) challenges the inclusion of **three specific entries** in **Manipur's Scheduled Tribe (ST) list: "Any Mizo(Lushai) Tribes," "Zou,"** and **"Any Kuki Tribes."**

- The main argument is that these tribes are **not "indigenous" to Manipur,** as there is no mention of them in pre-Independence Censuses.

- The representation asserts that the **ambiguity of the entries has facilitated illegal immigrants from Myanmar and Bangladesh** in wrongfully obtaining benefits meant for STs in India

Do these claims hold true?

- The claim that certain tribes were not residing in Manipur at the time of the **first Constitution (Scheduled Tribes) list in 1950** is **refuted**. The list included entries such as **"Any Kuki Tribe," "Any Lushai Tribe,"** and **"Any Naga Tribe."**

- While there is **no empirical evidence** supporting the notion that the presence of these tribe names in the list has facilitated **organized illegal immigration,** the **1955 First Backward Classes Commission** recommended adding **individual tribe names** to the **ST list** for **Assam** and the **hills of Manipur,** suggesting a need for updated information.

- In **1956**, the **ST list** for **Manipur** was revised, **including 29 entries** with **individual tribe names,** except for **"Any Mizo (Lushai) Tribe,"** which was retained, along with the tribe **"Zou."**

- The representation questions the lack of specific recommendations for these entries by the **First Backward Classes Commission**.

- The "splintering tendency" among **Kuki tribes,** noted by the **Lokur Commission in 1965**, led to the addition of **"Any Kuki Tribes"** to the **ST list** in **2002-2003,** addressing

the **identity concerns of a minority.**

- However, the **Bhuria Commission in 2002-2004** observed confusion and recommended mentioning **specific tribe names** in the **ST list** to prevent **inter-tribe differences**.

- The **Lokur Commission** chose to classify tribes as larger groups with sub-tribes, including synonyms, to address this argument

Important commissions:

- **First Backward Class Commission:** It was set up by a **Presidential Order** under **Article 340** of the Constitution of India on **Jan 29th, 1953**, under the **Chairmanship** of **Shri Kaka Kalelkar** (popularly known as **Kaka Kalelkar Commission**). It submitted its report on **March 30th, 1955**.

The criteria set out by the Lokur Committee (1965) for defining a community as a tribe are:

- indications of primitive traits, distinctive culture, geographical isolation, shyness of contact with the community at large.

- **Bhuria Commission 2002-04:** In **1995,** the **Bhuria Committee**, constituted to recommend **provisions for the extension of panchayat raj to Scheduled Areas,** recommended including these villages, but this is yet to be done. The **President of India notifies India's Scheduled Areas**.

- **Xaxa Committee (2013):** The Committee was **mandated** to examine the **socio-economic, educational and health status** of **tribal communities** and recommend appropriate interventional measures to improve the same. It submitted the report in **May 2014**.

Topic 25. RAINFALL RISING IN OVER HALF OF INDIA'S SUB-DISTRICTS, SAYS FOUR-DECADE STUDY

Important for the subject: Geography

A **detailed analysis of Indian monsoon changes** at the tehsil level reveals that **over 55% of India's 4,400 tehsils have experienced an increase in rainfall.**

- The study, conducted by the **Council on Energy, Environment and Water (CEEW)**, analyzes **high-resolution meteorological data** from **1982 to 2022** recorded by the **India Meteorological Department (IMD)**.

Study findings:

- Approximately **11%** of tehsils have observed **decreasing rainfall,** particularly during the **critical southwest monsoon**.

- Among tehsils with **reduced rainfall,** about **68%** experienced lower rainfall

throughout the monsoon months from **June to September,** and **87%** saw a **decline during the crucial June and July period,** impacting the **sowing phase of Kharif crops.**

- Most affected tehsils are **located** in the **Indo-Gangetic plains, northeastern India,** and the **Indian Himalayan region**, which collectively contributes to over **half of India's agricultural production**

At district level:

- An analysis at the **district level** in **India** over a period of time reveals that, collectively, the **country experienced 29 'normal', eight 'above-normal',** and **three 'below-normal' monsoon years.**

- However, when examining individual districts, **30% witnessed more years of deficient rainfall,** and **38%** saw many years of **excessive rainfall.**

- Notably, **23 districts,** including **New Delhi, Bengaluru, Nilgiris, Jaipur, Kachchh,** and **Indore,** experienced **both deficient and excessive rainfall** in higher proportions.

- Regions historically considered **dry,** such as several tehsils in **Rajasthan, Gujarat, central Maharashtra,** and parts of **Tamil Nadu,** have been getting **wetter,** aligning with the **overall trend of increasing rainfall** reported by a majority of tehsils.

- In the study of **localized wet rainfall extremes**, it was found that nearly **64% of Indian tehsils experienced an increase** in the **frequency of heavy rainfall days** by **1-15 days per year** in the past decade during the **southwest monsoon.**

- This trend is particularly **prominent** in tehsils of states with the **highest GDPs,** including **Maharashtra, Tamil Nadu, Gujarat,** and **Karnataka.** Additionally, in tehsils with **increased rainfall** during the **southwest monsoon,** the excess is attributed to **short-duration, heavy rainfall events**.

Increasingly erratic rainfall pattern:

- Over the last decade (2012-2022), **rainfall from the northeast monsoon,** primarily affecting **peninsular India** from **October to December,** has increased by more than **10%** in approximately **80%** of **tehsils in Tamil Nadu, 44%** in **Telangana,** and **39%** in **Andhra Pradesh.**

- While the **southwest monsoon** contributes to **76%** of **India's annual rainfall,** the **northeast monsoon** accounts for about **11%.**

- Notably, several tehsils in **Maharashtra, Goa, Odisha,** and **West Bengal** have reported **increasing rainfall** during these winter months, possibly due to **cyclonic activity in the Arabian Sea** and the **Bay of Bengal.**

- The **monsoons** play a **crucial role** in **influencing food production, water**

availability, and **energy transition.**

- **Hyper-local climate risk assessments and action plans** are essential for **India** to lead in **climate action and disaster risk reduction, safeguarding lives, livelihoods,** and **infrastructure** in the face of extreme weather events.

Topic 26. INDIA ACQUIRES FIVE LITHIUM BLOCKS IN ARGENTINA

Important for the subject: Geography

The **Mines Ministry**, through **KhanijBidesh India Limited (KABIL)**, signed an agreement with **Argentina's State-owned CAMYEN** for the development of five lithium blocks.

- **CAMYEN**, which stands for **Catamarca Minera Y Energetica Sociedad Del Estado,** is based out of the **Catamarca province** in the **Latin American nation.**
- The **State-owned KABIL** will start the **exploration** and **development** of **five lithium brine blocks,** namely **Cortadera-I, Cortadera-VII, Cortadera-VIII, Cateo-2022-01810132,** and **Cortadera-VI,** covering an area of about 15,703 hectares. **KABIL** is also preparing to set up a branch office at **Catamarca, Argentina.**

- This is the **first-ever lithium exploration and mining project** undertaken by a government company in India.

- **Argentina** is part of the world's **"Lithium Triangle"**, along with **Chile** and **Bolivia**, and the three together have **more than half of the world's total lithium resources.**

About lithium:

- Lithium is a **non-ferrous metal** and is one of the **key components in EV batteries.** It has the symbol **Li** and is a chemical element. It's a **silvery-white metal** with a delicate texture.

- It is the **lightest metal** and the **lightest solid element** under normal circumstances. It must be kept in **mineral oil** since it is **very reactive** and **combustible.** It is both an **alkali** and a **rare metal.**

India's lithium reserves:

- According to the **Indian Mines Ministry,** the government agencies made the small discovery of **lithium resources** at a site in **Mandya, Karnataka.** It is the country's **first lithium reserve.**

- Now, **Lithium** inferred resources have been found in the **Reasi District of Jammu & Kashmir (UT)**.

- **India's lithium requirements,** amounting to around **₹24,000 crore**, are met through **imports**, with the majority of supplies coming from **China**.

KhanijBidesh India Ltd (KABIL):

- **KABIL** is a **joint venture** between **National Aluminium Company (NALCO), Mineral Exploration Corporation Ltd (MECL)** and **Hindustan Copper Ltd (HCL).**

- It was formed in **2019** to identify, acquire, develop and process **strategic minerals** overseas for use in India.

- It has been concentrating on securing **copper, cobalt** and **lithium** and in some cases **nickel** supplies among the critical minerals identified.

Topic 27. INDIA'S SHIPPING MIN DEVELOPING RIVER PILGRIMAGE CRUISES INCLUDING ALONG AYODHYA – VARANASI – MATHURA

Important for the subject: Geography

The **Ministry of Ports, Shipping, and Waterways (MoPSW)** in India is actively promoting **river pilgrimage circuits** as cruises gain popularity.

- A circuit covering **seven temples** in **Assam** along **National Waterways 2** has been **developed**, and plans are underway for tours along the **Ayodhya – Mathura – Varanasi circuit.**
- New cruise vessels and electric Catamarans have been ordered for these circuits, with the **Inland Waterways Authority of India** procuring **Catamarans** for **Ayodhya, Varanasi, Mathura,** and **Guwahati.**

- MoUs were signed last year to establish **riverine-based religious tourism circuits** through **special purpose vehicles.**

- Currently, **four cruise vessels** for pilgrimage river cruises are operational in **Varanasi**, and in **Assam,** services are provided on a '**Hop-on & Hop-off' basis** covering temples like **Kamakhya, Pandunath, Ashwaklanta, Doul Govida, Umananda, Chakreshwar,** and **Auniati Satra**.

Ayodhya river cruise:

- One vessel, **MV Guh,** is en route to **Ayodhya**, while the second is expected to be deployed in the coming months.

- There is a particular emphasis on promoting pilgrimage tourism in the region. Additionally, the **Uttar Pradesh government** is actively promoting **river cruises in Mathura and Ayodhya**.

Existing Cruises:

- Currently, there are a total of **14 cruise vessels** operating on **National Waterways 1,** covering the **river Ganges.**

- **Four cruises** of **'Nordic Cruise Line'** are operate around **Varanasi;** and two cruise vessels of **Assam Bengal Navigation Company** operate along **Kolkata, Farakka,**

Patna, Ghazipur, Varanasi, Sarnath, Chunar, and **Raj Ghat routes.**

- Three cruise vessels of **Heritage River** Journeys operate between **Kolkata, Maitiari, Murshidabad, Chandernagore** and **Kolkata**.

- **Vivada Inland Waterways** has four cruise vessels plying between **Sunderban, Ganga Sagar, Kolkata, Farakka, Bhagalpur, Mungher,** and **Semaria**

- Four cruise vessels operate on **National Waterways 2** across circuits like **Jogighopa, Saulkhuchi, Guwahati, Silghat Kaziranga National Park, Biswanath Ghat, Majuli** and **Neamati**.

Sarayu river:

- The **Sarju** also known as **Sarayu**, is a **major river** draining **Central Kumaon region** in the Indian state of Uttarakhand.

- Originating from **Sarmul, Sarju** flows through the cities of **Kapkot, Bageshwar** and **Seraghat** before joining **Mahakali** at **Pancheshwar.**

- The Sarju is the **largest tributary of the Sharda River.**

- The river forms the **South-eastern border** between the districts of **Pithoragarh** and **Almora.**

- Temperate and sub-Tropical forests cover the entire Catchment area of the River.

Tributaries:

1. **Left**– Ramganga, Punger

2. **Right-** Gomati, Panar, Lahor

Topic 28. INDEPENDENCE OF DISTRICT JUDICIARY IS PART OF BASIC STRUCTURE OF CONSTITUTION: SUPREME COURT

Important for the subject: Polity

The SC has held that the independence of district judiciary is part of the basic structure of the Constitution.

A **three-judge Bench of Chief Justice D.Y. Chandrachud** and **Justices V. Ramasubramanian and P.S. Narasimha** observed in a judgment that the independence of district judiciary is part of the basic structure of the Constitution.

- SC has said that **judicial independence** from the **executive and the legislature** requires the judiciary to have a say in matters of finances. Justice Narashimha said that important to recognise that the **district judiciary is a vital part of the independent judicial system**, which is in turn part of the basic structure of the Constitution

Importance of District Judiciary:

- The **independence of the district judiciary** must also be equally a part of the basic structure of the Constitution.

- The **district judiciary** is, in most cases, also the court which is most **accessible to the litigant.** The judgment records the crucial role played by the **district judiciary in the justice administration system.**

- It is important to ensure the **financial security and economic independence of the district** judiciary.

- Judiciary must possess the inherent power to **compel payment of those sums of money** which are reasonable and necessary to carry out its mandated responsibilities, and its powers and duties to administer justice

Constitutional provisions:

Appointment:

Article 233 of the Constitution of India(**Part 6**)

- Appointments of persons to be, and the posting and promotion of, **district judges in any State shall be made by the Governor of the State** in consultation with the **High Court** exercising jurisdiction in relation to such State.

- A person **not already in the service of the Union or of the State** shall only be eligible to be appointed a district judge if he has been for not less than seven years an advocate or a pleader and is recommended by the High Court for appointment.

Qualifications:

- He should have been an **advocate or pleader for 7 years.**

- He should be recommended by the **high court.**

- He shouldn't **already be in the service of the center or state.**

Basic structure Doctrine:

- It was developed by the Supreme Court of India in a series of constitutional law cases in the 1960s and 1970s that culminated in **Kesavananda Bharati v. State of Kerala,** where the doctrine was formally adopted.

- The basic structure doctrine is a **common law legal doctrin**e that the constitution of a sovereign state has certain characteristics that cannot be erased by its legislature.

- The origins of the basic structure doctrine are found in the **German Constitution** which, after the Nazi regime, was amended to protect some basic laws. The doctrine is recognised in **India, Bangladesh, Pakistan, and Uganda.**

- **The Supreme Court is yet to define or clarify as to what constitutes the basic structure of the Constitution.**

From the various judgments, the following have emerged as basic features of the Constitution or elements of the 'basic structure' of the constitution:

1. Supremacy of the Constitution

2. Sovereign, democratic and republican nature of the Indian polity

3. Secular character of the Constitution

4. Separation of powers between the legislature, the executive and the judiciary

5. Federal character of the Constitution

6. Unity and integrity of the nation

7. Welfare state (socio-economic justice)

8. Judicial review

9. Freedom and dignity of the individual

10. Parliamentary system

Rule of law

1. Harmony and balance between Fundamental Rights and Directive Principles

2. Principle of equality

3. Free and fair elections

4. Independence of Judiciary

5. Limited power of Parliament to amend the Constitution

6. Effective access to justice

7. Principle of reasonableness

8. Powers of the Supreme Court under Articles 32, 136, 141 and 142

Topic 29. CBI REGISTERS FIR AGAINST ENVIRONICS TRUST FOR ALLEGED VIOLATION OF FCRA PROVISIONS

Important for the subject: Polity

The **CBI has alleged that Environics Trust** has funded agitators and had been involved in activities creating law and order issues in the country. The CBI has alleged that Environics Trust has funded agitators and had been involved in activities creating law and order issues in the country.

- As of now, there are **22,457 NGOs or associations registered under the FCRA**, while

the licenses of 20,674 were canceled and 6,702 are deemed to have expired.

About FCRA:

- **Foreign funding of persons in India is regulated under FCRA act and is implemented by the Ministry of Home Affairs**.

- Individuals are permitted to accept foreign contributions without permission of MHA. However, the monetary limit for acceptance of such foreign contributions shall be less than Rs. 25,000.

- **As defined in Section 2(1)(h) of FCRA, 2010, "foreign contribution" means the donation, delivery or transfer made by any foreign source.**

Foreign source, as defined in Section 2(1) (j) of FCRA, 2010 includes:-

- the **Government of any foreign country or territory** and any agency of such Government;

- any **international agency, not being the United Nations or any of its specialized agencies,** the World Bank, International Monetary Fund or such other agency as the Central Government may, by notification, specify in this behalf;

a foreign company;

- **a corporation, not being a foreign company, incorporated in a foreign country or territory; a multinational corporation referred to in sub-clause of clause; a company within the meaning of the Companies Act, 1956,**

- This Act ensures that the **recipients of foreign contributions** adhere to the stated purpose for which such contribution has been obtained.

- Under the Act, **organizations are required to register themselves every five years.** Registered **NGOs can receive foreign contributions** for five purposes: Social, educational, religious, economic and cultural.

- Suspension of FCRA license means that the **NGO can no longer receive fresh foreign funds from donors pending a probe by the Home Minister.** The FCRA is mandatory for associations and **NGOs to receive foreign funds.**

The Foreign Contribution (Regulation) Amendment Bill, 2020:

- **Prohibition to accept foreign contribution:** Under the Act, certain persons are prohibited to accept any foreign contribution.

- These include: **election candidates, editor or publisher of a newspaper, judges, government servants, members of any legislature, and political parties, among others.**

- **Transfer of foreign contribution:** Under the Act, foreign contribution cannot be transferred to any other person unless such person is also registered to accept foreign

contribution (or has obtained prior permission under the Act to obtain foreign contribution).

Aadhaar for registration: The Act states that a person may accept foreign contribution if they have:

- (i) obtained a certificate of registration from central government, or

- (ii) not registered, but obtained prior permission from the government to accept foreign contributions.

- **FCRA account:** Under the Act, a registered person must accept foreign contributions only in a single branch of a scheduled bank specified by them.

- **Restriction in utilization of foreign contribution:**The Bill adds that the government may also restrict usage of unutilised foreign contribution for persons who have been granted prior permission to receive such contribution.

- **Renewal of license:**Under the Act, every person who has been given a certificate of registration must renew the certificate within six months of expiration.

- **Reduction in use of foreign contribution for administrative purposes:** Under the Act, a person who receives foreign contribution must use it only for the purpose for which the contribution is received.

- **Surrender of certificate:** The Bill adds a provision allowing the central government to permit a person to surrender their registration certificate.

Eligibility and Procedure for FCRA license:

- The FCRA registration guidelines require that the Association should be a non-profit organization and must be registered under one of the Indian societies laws:

The Indian Societies Registration Act, 1860 or.

The Indian Trusts Act, 1882 or.

Section 25 of the Companies Act, 1956.

- **NGOs that want to receive foreign funds must apply online** in a prescribed format with the required documentation.

- FCRA registrations are **granted to individuals or associations** that have definite cultural, economic, educational, religious, and social programmes.

- Following the application**, the MHA makes inquiries through the Intelligence Bureau into the antecedents of the applicant, and accordingly processes the application.**

- The applicant should not be fictitious or benami and should not have been prosecuted or convicted for indulging in activities aimed at conversion through inducement or force,

either directly or indirectly, from one religious faith to another.

- The applicant should also not have been prosecuted for or convicted of creating **communal tension or disharmony**, **should not have been found guilty of diversion**, **misutilisation of funds and should not be engaged or likely to be engaged in the propagation of sedition.**

- The MHA is required to approve or **reject the application within 90 days.** In case of failure to process the application in the given time, **the MHA is expected to inform the NGO of the reasons for the same.**

Topic 30. COURTS SHOULD NOT ALLOW SUITS THAT SEEK TO CONVERT PLACES OF WORSHIP

Important for the subject: Polity

Allahabad High Court order to appoint a commissioner to inspect the Shahi Idgah Mosque in Mathura, the Supreme Court has stalled for a while a likely move to get the status of the place of worship altered through the courts.

What is the Places of Worship Act?

- It was enacted **to freeze the status of religious places of worship as they existed on August 15, 1947, and prohibits the conversion of any place of worship** and ensures the maintenance of their religious character.

Major Provisions of the Act:

Prohibition of Conversion (Section 3):

- Prevents the conversion of a place of worship, whether in full or part, from one religious' denomination to another or within the same denomination.

Maintenance of Religious Character (Section 4(1)):

- Ensures that the religious identity of a place of worship remains the same as it was on August 15, 1947.

Abatement of Pending Cases (Section 4(2)):

- Declares that any ongoing legal proceedings concerning the conversion of a place of worship's religious character before August 15, 1947, will be terminated, and no new cases can be initiated.**Exceptions to the Act (Section 5):**

- The Act does not apply to ancient and **historical monuments, archaeological sites, and remains covered by the Ancient Monuments and Archaeological Sites and Remains Act, 1958.**

- It also excludes cases that have already been settled or resolved and disputes that have been resolved by mutual agreement or conversions that occurred before the Act came into

effect.

- The Act does not extend to the specific place of worship known as **Ram Janmabhoomi-Babri Masjid in Ayodhya,** including any legal proceedings associated with it.

Penalties (Section 6):

- Specifies penalties, including a maximum imprisonment term of three years and fines, for violating the Act

Criticism:

Bar on Judicial Review:

- Critics argue that the Act prevents judicial review, which is a fundamental aspect of the Constitution.

Arbitrary Retrospective Cutoff Date:

- The Act is criticized for using an arbitrary date (Independence Day, 1947) to determine the status of religious places.

Violation of the Right to Religion:

- Critics claim that the Act infringes upon the religious rights of Hindus, Jains, Buddhists, and Sikhs.

Violation of Secularism:

- Opponents argue that the Act violates the principle of secularism, which is a core component of the Constitution, and favours one community over others**Exclusion of Ayodhya Dispute:**

- The Act is specifically criticized for excluding the land involved in the Ayodhya dispute.**Supreme Court's Stance on the Act:**

- The Supreme Court views the Places of Worship Act as a **legislative intervention** that upholds the commitment to secularism, a fundamental aspect of the Indian Constitution.

Topic 31. UNDERSTANDING THE TENTH SCHEDULE

Important for the subject: Polity

The Speaker of the Maharashtra Legislative Assembly has refused to disqualify 40 MLAs of the Eknath Sindhe faction after recognising it as the real Shiv Sena. In Legislature, a **defector is a person who gives up allegiance to one party in exchange for allegiance to another, changing sides in a way which is considered illegitimate by the first party.**

- In India, the defections of legislators during the 1960s and 70s from their parent parties created political instability in many States, bringing down elected governments. Therefore, to ensure the stability of elected governments, the **52nd constitutional**

amendment introduced the 'anti-defection' law through the **Tenth Schedule in 1985.**

What is Anti-Defection Law?

- The 52nd Amendment Act, 1985 provided for the disqualification of the members of Parliament and state legislatures on the ground of defection from one political party to another.

- Through this amendment, a new Schedule i.e. Schedule 10 was added to the Constitution. This act is often referred to as the 'anti-defection law'.

- Later, the 91st Amendment Act, 2003 made one change in the provisions of the Tenth Schedule. It **omitted an exception provision i.e., disqualification on ground of defection not to apply in case of split.**

Various Features of the Act:

- The Tenth Schedule contains the following **provisions with respect to the disqualification** of members of Parliament and the state legislatures on the ground of defection.

Disqualification:

Members of Political Parties:

- If he voluntarily gives up his membership of such political party; or

- If he votes or abstains from voting in such House contrary to any direction issued by his political party without obtaining prior permission of such party.

Independent Members:

- An independent member of a House (elected without being set up as a candidate by any political party) becomes disqualified to remain a member of the House if he joins any political party after such election.

Nominated Members:

- A nominated member of a House becomes disqualified for being a member of the House if he joins any political party after the expiry of six months from the date on which he takes his seat in the House.

Exceptions:

- If a member goes out of his party as a result of a **merger** of the party with another party. A merger takes place when **two- thirds of the members** of the party have agreed to such merger.

- If a member, after being elected as the presiding officer of the House, voluntarily gives up the membership of his party or re-joins it after he ceases to hold that office.

Deciding Authority:

- Any question regarding disqualification arising out of defection is to be decided by the **presiding officer of the House.**

- In **KihotoHollohan case** (**1993**), the Supreme Court held that the presiding officer, while deciding a question under the Tenth Schedule, **function as a tribunal.**

- Hence, his decision like that of any other tribunal, is Important for the subject to judicial review on the grounds of mala fides, perversity, etc.

Important Judgements w.r.t. Anti-Defection Law:

- In **Kihoto Hollohan case,** the Supreme Court held that the law is valid in all respects, expect on the matter about judicial review, which was held to be unconstitutional.

- In **Shri Rajesh Verma v. Shri Mohammad Shahid Akhlaque case**, the court held that if the member of the party publicly opposes his original party and supports the other the party then this act deems to be a resignation from the party.

- In **Mannadi Satyanarayan Reddy v Andhra Pradesh Legislative Assembly case**, the question was raised regarding the jurisdiction of Speaker or Presiding Officers.

- The court held that there is no provision in the Tenth Schedule which fetters exercise of jurisdiction by the Speaker to decide this question.

Benefits of Anti-Defection Law:

- It provides for **greater stability in the body politic by checking the propensity of legislators** to change parties. It facilitates **democratic realignment of parties** in the legislature by way of merger of parties.

- It reduces corruption at the political level as well as non- developmental expenditure incurred on irregular elections. It gives, for the first time, a clear-cut constitutional recognition to the existence of political parties.

Criticism of the Anti-Defection Law:

- The law does not make a **differentiation between dissent and defection**. It curbs the legislator's right to dissent and freedom of conscience.

- It does not provide for the expulsion of a legislator from his party for his activities outside the legislature.

- Its **discrimination between an independent member and a nominated member** is contradictory. If the former joins a party, he is disqualified while the latter is allowed to do the same.

Topic 32. COMING FLOOD OF U.S. TREASURY ISSUANCE SPOOKS SOME INVESTORS

Important for the subject: Polity

Cracks are forming in the   market's bullish consensus   for bonds, as resurfacing fiscal concerns duel with expectations that **cooling inflation will push the Federal Reserve to cut interest rates in coming months.**

- A bond is a debt investment to raise money and finance a variety of projects and activities. Corporates or governments issue bonds directly to investors, instead of obtaining loans from a bank.

- The investor buys the bonds and loans money to the entity and in turn receives fixed interest.

- This is for a defined period of time (till maturity date) and a variable or fixed interest rate (coupon rate).

Bond prices, Bond yields and interest rates Linkages

Bond Price –

- Face value is the money amount the bond will be worth at its maturity. It is also the **reference amount** the bond issuer uses when calculating interest payments.

- The issuance price of a bond is typically set at par face value. But a bond's price changes on a daily basis, just like that of any other publicly-traded security.

The actual market price of a bond depends on various factors including:

1. the credit quality of the issuer

2. the length of time until expiration

3. the coupon rate compared to the general interest rate environment at the time

Interest rates –

- The price of a bond primarily changes in response to changes in interest rates in the economy.

- For instance, say the investors get a better return in corporate bond either due to rise in their rate or due to fall in rate of government's bond.

- This would make the corporate bond much more attractive. Investors in the market will bid up the price of the bond until it trades at a premium that equalizes the prevailing interest rate environment.

Bond Yield –

- In simple terms, **yield is the amount of return that an investor will realize on a bond.**

- If the investor holds the bond to maturity, s/he will be guaranteed to get the principal amount back plus the interest. However, a bond does not necessarily have to be held to maturity by the investors.

- Instead, investors may sell them for a higher or lower price to other investors. The **bond prices and yields generally move in opposite directions.**

- This is because, as a bond's price increases, its yield to maturity falls.

What causes the rise in bond yields?

- The major factors affecting the yield are –

- the monetary policy of the Central Banks, especially the course of interest rates, the fiscal position of the government

- government's borrowing programme global markets, economy, and inflation. **A fall in interest rates makes bond prices rise and bond yields fall and vice versa.**

- In short, a rise in bond yields means interest rates in the monetary system have fallen.

- In other words, the returns for investors (those who invested in bonds and government securities) have declined.

Topic 33. WHY KASHMIR IS WITHOUT SNOW

Important for the subject: Polity

Snowfall events in the Ladakh-Jammu and Kashmir region have been showing a declining trend in recent years. Government data shows that **95,989 tourists, including 547 foreigners,** had visited Gulmarg in January last year.

- Officials said the **footfall seemed to be at least 60 percent lower this year. Snowfall in Kashmir attracts tourists** and is crucial for the local climate, winter crops and horticulture, availability of waters in streams and rivers, and for the local economy as well.

- **Winter precipitation in Jammu and Kashmir and in Ladakh** is mainly in the form of snowfall.

- As per **India Meteorological Department (IMD) data**, Jammu and Kashmir saw **80 per cent rainfall deficit in December** and 100 percent (absolutely no rain) deficit in January so far.

- The overall decreasing trend of snowfall has been attributed to a decline in **western disturbance events and gradual rise in temperatures,** which involves the role of climate change.

Reasons for low snowfall

Western Disturbances:

- Winter precipitation in the **Himalayan region is caused mainly by Western Disturbances.**

- These are **large eastward-moving rain-bearing wind systems** that **originate beyond Afghanistan and Iran,** picking up moisture from as far as the Mediterranean Sea and even the Atlantic Ocean.

- **Western Disturbances are the primary source of rainfall** over north and northwest India during the post-monsoon and winter months.

- **Western disturbances have been showing a declining trend** in recent times.

Increasing temperatures:

- Temperatures in Jammu & Kashmir and Ladakh region are rising at a faster pace.

- The rate of increase of temperature is seen to be higher in the upper elevation areas than in the plains.

- This is also contributing to the decline in snowfall.

El Nino:

- There have been several years in the **last one decade i.e. 2022, 2018, 2015** — when winters have been relatively dry in Jammu and Kashmir, and snowfall has been very low.

- **El Nino has persisted for a few months and will continue to do so in the coming months,** affecting the global atmospheric circulation and contributing to the deficit precipitation in the region .

- Even in the absence of El Nino, some years had seen very less snowfall.

Repercussions

- Less snowfall in the region is expected to have both short-term and long-term implications.

Long-term implications include the

- generation of **less hydroelectricity** an increase in the **rate of glacier melting** an a**dverse impact on the drinking water supply** as scanty snowfall means very little recharge of groundwater.

Short term implications include

- a **dry spell can result in an increase** in forest fires, **agricultural drought**, and a **drop**

in crop production.

Other implications:

- It can lead to an early spring leading to early flowering, **which can cause a reduction in yield.**

- Yields of apples or saffron are badly affected in the absence of snowfall as **winter snow is a source of steady moisture** to the soil.

Topic 34. NEED REASONABLE CAP ON ISSUE OF GUARANTEES BY STATES FOR BETTER FISCAL MANAGEMENT: RBI

Important for the subject: Polity

RBI Working Group has recommended that they should be Important for the subject to a **reasonable cap on issuance of guarantees. Government guarantees** should not be allowed for creating direct liability / de facto liability on the State.

- States have been cautioned against using **guarantees to obtain finance through State Owned Entities.**

- The Working Group on **'State Government Guarantees,'** consists of members from the **Ministry of Finance, Government of India; Comptroller and Auditor General of India; and some State Governments.**

- The group emphasized that **guarantee is a potential future** liability that is contingent on the occurrence of an unforeseen future event.

- States should continue with their contributions towards building up the **Guarantee Redemption Fund** to a desirable level of **5 percent of their total outstanding guarantee**s over a period of **five years from the date of constitution of the fund.**

- As of March end 2021, outstanding guarantees issued by the States stood at ₹7.40lakh crore, or **3.7 per cent of their combined SGDP.**

Key recommendations of the working group:

- The state governments should consider **fixing a ceiling for the incremental guarantees** they issue during **a year at 5 percent of the revenue receipts or 0.5 per cent of Gross State Domestic Product, whichever is less.**

- It suggested that the **state government assess, monitor and be prudent** while issuing guarantees.

- State governments may consider **charging a minimum guarantee fee for guarantees** extended and **additional risk premium may be charged based** on the risk category and the tenor of the underlying loan.

- It also suggested that state governments may publish data relating to guarantees, as per

the **Indian Government Accounting Standard (IGAS).**

- **A minimum of 0.25 percent per annum** may be considered as the base or minimum guarantee fee.

- An **additional risk premium which is based on risk assessment by the State government**, may be charged to each risk category of issuances.

- The group said **State governments need to classify the projects/ activities as high risk,** medium risk and low risk and assign appropriate risk weights before extending guarantee for them, said the group.

- Such **risk categorisation should also take into consideration** the past record of defaults.

About Guarantee Redemption Fund (GRF):

- The objective of the GRF is to **provide a cushion for servicing contingent liabilities** arising from the invocation of guarantees issued by the State governments, in respect of bonds and other borrowings by State Level undertakings or other bodies.

- Though the **participation from the states in GRF is voluntary**.

- **Around19 States** have already established GRF.

- The GRF corpus is managed by the **RBI.**

Topic 35. DEFENSE TECHNOLOGY COUNCIL

Important for the subject: Polity

Expert committee headed by **Vijay Raghavan (former principal scientific advisor)** recommended that **an apex body known as Defence Technology Council chaired by the Prime Minister** should determine the country's defense technology roadmap.

- The **nine-member Vijay Raghavan panel** was set up by the government last year to review the functioning of the **Defence Research and Development Organisation (DRDO).**

- The government's decision to review the functioning of DRDO comes against the backdrop of several of its projects suffering from huge delays.

- The **Parliamentary Standing Committee on Defence** had expressed concerns that 23 of its 55 mission mode projects could not be completed in time.

- VijayRaghavan committee has observed that the DRDO should focus on its **original goal of research and development for defense.**

- DRDO should refrain from involving itself in productization, production cycles, and product management, tasks that are more suitable for the private sector.

About Defence Technology Council:

- **The Defence Technology Council headed by the Prime Minister** would play a pivotal role in identifying the right players for specific defense technologies.

- **The defence minister and the National Security Advisor** will act as Vice Presidents. It will **determine the country's defense technology roadmap** and decide on major projects and their execution.

- The Defence **Technology Council is proposed to have an executive committee** to be chaired by the Chief of Defence Staff.

- The **Principal Scientific Advisor, along with the three service chiefs** and their vice chiefs will also be its members.

The Department of Defence Science, Technology, and Innovation:

- The panel suggested creating a separate department under the **Defence Ministry — the Department of Defence Science, Technology, and Innovation.**

- This department is proposed **to be headed by a technocrat.** It will promote defense **research and development in the academic and start-up ecosystem.** It will also serve as the secretariat for the **Defence Tech Council.**

- This department will draw scientists from **DRDO and academia, building a repository of knowledge on production expertise and conducting background research for the DTC.**

- The department will **operate labs for testing and certification**, a function also performed by DRDO.

Mission mode project:

- A Mission Mode project of the **DRDO refers to a focused and time-bound development** undertaken to achieve specific goals and objectives in the field of defense and technology.

Topic 36. CLIMATE CRISIS: DROUGHT CAUSES MASS ELEPHANT DEATHS IN ZIMBABWE GAME RESERVE

Important for the subject: Environment

In the last two months of 2023, over **160 elephants** and **numerous other wildlife species** perished in **Zimbabwe's Hwange National Park** due to a **severe drought caused by climate change,** as reported by the **Zimbabwe Parks and Wildlife Authority (ZimParks).**

- This drought affected the **southern African region** and had a significant impact on the park, which spans 14,600 square kilometres and is home to around 45,000 elephants. The

drought was influenced by the **El Niño weather pattern** linked to **climate change**. This **prolonged dry spell** also caused **elephants** to **migrate** from **Hwange** to neighbouring **Botswana** in search of water and food.

About Hwange National Park (formerly Wankie Game Reserve):

- Located in **Zimbabwe**, is part of the **Kavango Zambezi Trans frontier Conservation Area (KAZA-TFCA),** which includes **Angola, Botswana, Namibia, Zambia,** and **Zimbabwe.**

- **Hwange National Park** is also known for its **diverse wildlife,** including **over 100 mammal** and **400 bird species**. It is the **largest natural reserve** in **Zimbabwe.** It lies near to the **Victoria falls.**

- Unlike other parts of **KAZA-TFCA, Hwange National Park lacks perennial rivers** or other reliable **natural water sources**, making it heavily reliant on **110 solar-powered boreholes for water** during dry seasons.

Severe drought forecast:

- The **National Oceanic and Atmospheric Administration** predicts that an **El Niño weather phenomenon** will cause **hot, dry weather** with **little rainfall** in the **southern African region** during this period.

- This aligns with the **Intergovernmental Panel on Climate Change's classification of southern Africa** as a **region at high risk of climate change,** with **increased heat** and **reduced rainfall.**

- **Zimbabwe Meteorological Services Department** reports a significant **rise** in both **daily minimum and maximum temperatures** over the last century, with **fewer cold days** and **more hot days.**

Climate change threat to wildlife:

- The **International Fund for Animal Welfare (IFAW)** emphasizes the need for an integrated approach to support **climate-resilient landscapes and communities**. In **2019**, over **200 elephants** in **Zimbabwe died** due to **severe drought**.

- **IFAW** advocates for wildlife conservation as a key solution to climate change at international forums like COP28.

- The **African Wildlife Foundation (AWF)** also stresses the **impact of reduced water access on wildlife and human welfare.**

- There is the risk of **flash floods** and **harsh droughts** in **Africa's industrializing landscapes** and the **struggle of smaller species to adapt to reduced rainfall and drying water sources.**

- Larger animals like buffaloes and antelopes become weakened and easy prey for

predators under severe water shortages.

- Following the **devastating drought in 2019,ZimParks** and its partners are taking mitigatory measures, including **one of southern Africa's largest wildlife translocation exercises**. Over **2,500 animals,** including **400 elephants,** are being moved from the **arid south** to **more favourable northern conservancies**. This **translocation,** a costly last resort, **aims** to alleviate the impact of climate change on wildlife in **Zimbabwe**.

International Fund for Animal Welfare (IFAW):

- Founded in **1969**, in **New Brunswick, Canada. IFAW** is **one of the largest animal welfare and conservation charities** in the world.

- The organization **works** to **rescue individual animals, safeguard populations, preserve habitat,** and **advocate for greater protection.**

Brian Davies founded IFAW.

- **IFAW** was instrumental in **ending the commercial seal hunt** in **Canada.**

- In **1983Europe** banned all **whitecoat harp seals products.** This ban helped save over 1 million seals.

- IFAW operates in over 40 countries.

- **Headquarters:** Washington, D.C., United States

Topic 37. NEW AMENDMENTS IN WILDLIFE TRADE RULES ENABLE ISSUING LICENCES FOR CERTAIN SCHEDULE II SPECIES

Important for the subject: Environment

The **Indian government** has **revised** the **Wild Life (Protection) Licensing (Additional Matters for Consideration) Rules 2024**, providing **new guidelines** for **issuing wildlife trade licenses.** This is the **first update since 1983** and came into effect on **January 16, 2024.**

About Wild Life (Protection) Licensing (Additional Matters for Consideration) Rules 2024:

- The **1983 rules restricted licenses** for **trading wild animals listed under Schedule I** or **Part II of Schedule II** of the **Wildlife Protection Act 1972, except in exceptional cases** with **central government approval**.

- The **new guidelines** state that **licenses will not be granted for animals specified in Schedule I without prior consultation with the central government.** Officials must consider the **applicant's capacity to handle the business,** including **facilities, equipment,** and **premises feasibility**.

- The **source** and **method of obtaining supplies** and the **number of existing licenses in**

the area are also **factors** to be considered, as well as the **impact on hunting** or **trading** the **concerned wild animals.**

- The **notification does not explain why restrictions on Schedule II species** have been **lifted.** In a **2022 amendment** to the **Wildlife Protection Act 1972, four schedules** of **wild animals** were **merged into two, reducing the total from six to four.**

- **Schedule I** now includes **animals requiring utmost protection,** while **Schedule II** covers **species needing comparatively lower protection**.

- **Plant species** are listed under **Schedule II,** and **Schedule IV** is for **species protected under CITES** (Convention on International Trade in Endangered Species of Wild Fauna and Flora).

- **Schedule II** of the **Wildlife Protection Act 1972** lists various **birds, reptiles, mammals,** and **amphibians,** including **sparrows, owls, snakes, turtles, deer,** and **frogs.**

- According to the **World Wildlife Report 2020,** about **6,000 species of flora and fauna** were **seized globally** between **1999-2018,** indicating the scale of the wildlife trade.

Key provisions of the Wildlife Protection (Amendment) Bill, 2021:

Standing Committees of State Boards of Wildlife:

- The Bill proposes setting up of Standing Committees of State Boards of Wildlife. These committees will function like the National Board for Wildlife NBWL).

- It will be able to make decisions on wildlife management and permissions granted for projects without having to refer most projects to the NBWL.

Rationalization of Schedules for Wildlife:

- The bill rationalises Schedules for Wildlife under the Act by bringing it **down from 6 to 4 major schedules.**

- For example, A schedule I category of wildlife (such as Tigers) are the highest protected under the Act.

Wildlife Management Plans:

- The Bill mandates that Wildlife Management Plans which are prepared for sanctuaries and national parks across the country will now become a part of the Wildlife Act.

- Further, they will have to be approved by the Chief Wildlife Warden of the state. Earlier, the plans were approved through executive orders.

- There is also the insertion of a **new section 42A** about surrender of wild animals and products. The inclusion of the **new Section 62A(l) that defines alien invasive species.**

- It has mandated the need to consult the Gram Sabha in protected areas falling under

scheduled areas or areas recognised to possess forest rights based on claims under the Forest Rights Act, 2006.

Wildlife (Protection) Act, 1972:

- The Act was enacted for the protection of plants and animal species. It has **six schedules that give varying degrees of protection.**

- Schedule I and part II of Schedule II provide absolute protection – offenses under these are prescribed the highest penalties.

- Species listed in Schedule III and Schedule IV are also protected, but the penalties are much lower.

- Schedule V includes the animals which may be hunted. The specified endemic plants in Schedule VI are prohibited from cultivation and planting.

- The hunting to the Enforcement authorities has the power to compound offenses under this Schedule (i.e. they impose fines on the offenders). The act has been amended in 1982, 1986, 1991, 1993, 2002, 2006 and 2013.

Topic 38. HOW DO YOU PLAN TO SAVE THE GREAT INDIAN BUSTARD, SUPREME COURT ASKS THE GOVERNMENT

Important for the subject: Environment

The Supreme Court has instructed the Indian government to disclose its plans to protect the **critically endangered Great Indian Bustard** by February.

- The directive emphasizes the need for a strategy to **prevent the bird's extinction,** primarily caused by **collisions with high transmission power lines** in **Gujarat** and **Rajasthan.**

- The Supreme Court issued the directive regarding the **protection of the Great Indian Bustard** in areas that are both **natural habitats of birds** and **significant solar power producers.**

- The court acknowledged the challenge of **balancing anti-carbon footprint commitments with bird preservation efforts**.

  About the Great Indian Bustard (GIB):

- One of the **heaviest flying birds endemic to the Indian subcontinent.**

- **State Bird** of **Rajasthan.**

  Habitat:

- Untamed, Arid grasslands. Among the heaviest birds with flight, **GIBs** prefer **grasslands** as their habitats

- A Maximum number of GIBs were found in **Jaisalmer** and the **Indian Army-controlled field firing range near Pokhran, Rajasthan.**

- **Other areas:** Gujarat, Maharashtra, Karnataka and Andhra Pradesh.

 Population:

- As per the studies conducted by the **Wildlife Institute of India,** there are around **150 Great Indian Bustards** left across the country which includes about **128 birds in Rajasthan** and **less than 10 birds** each in the States of **Gujarat, Maharashtra, Andhra Pradesh** and **Karnataka.**

- While the **GIBs' historic range** included much of the **Indian sub-continent,** it has now **shrunk to just 10 per cent** of that.

 Protection Status:

- **IUCN Status:** Critically Endangered. Listed in **Wildlife Protection Act**'s Schedule 1.

 Significance of GIBs in the ecosystem:

- Terrestrial birds spend most of their time on the ground, feeding on insects, lizards, grass seeds, etc. **GIBs** are considered the **flagship bird species of grassland** and hence **barometers of the health of grassland ecosystems.**

Why is the Great Indian Bustard endangered?

- Among the **biggest threats** to the **GIBs** are **overhead power transmission lines.**

- Due to their **poor frontal vision,** the birds **can't spot the power lines** from a distance, and are too heavy to change course when close. Thus, they collide with the cables and die. According to the **Wildlife Institute of India (WII)**, in Rajasthan, **18 GIBs** die every year after colliding with overhead power lines.

Topic 39. MNRE LAUNCHES SCHEME TO INCENTIVISE PRODUCTION OF GREEN HYDROGEN

Important for the subject: Environment

The Union **Ministry of New and Renewable Energy (MNRE)** has recently published **guidelines and incentives** to promote the **procurement of green hydrogen** as part of the **National Green Hydrogen Mission (NGHM)**.

Strategic Interventions for Green Hydrogen Transition (SIGHT) programme:

- Under the **NGHM, Rs 17,490 crore** has been set aside for the **SIGHT programme**, to bolster **domestic electrolyser manufacturing** and **green hydrogen production.** These incentives are designed to facilitate **cost reduction** and **rapid expansion**.

- **Green hydrogen** is essential for **removing sulfur content in crude oil** to

produce **petrol** and **diesel**.

Implementation:

- Implemented under **Mode-2B,** a system adopted by the **MNRE** for the **SIGHT scheme,** this approach involves **aggregating demand and soliciting bids for green hydrogen** and its **derivatives production** and supply at the **lowest cost** through a **competitive selection process.**

Programme execution:

- Entrusted to agencies nominated by the **Union Ministry of Petroleum and Natural Gas (MoPNG),** primarily **oil and gas companies,** guided by the **Centre for High Technology (CHT)**.

- **Hindustan Petroleum Corporation** is reportedly constructing a 370 tonnes per annum **green hydrogen plant** at its **Visakhapatnam refinery**.

Who is eligible for incentives?

- To qualify for incentives under the scheme, bidders must meet the criteria outlined in the **'National Green Hydrogen Standard'** as notified by **MNRE**.

- The scheme offers a **direct incentive over three years** from the beginning of production and supply, with rates of **Rs 50 / kilogramme of green hydrogen** in the **first year, Rs 40 / kg** in the **second year** and **Rs 30 / kg** during the **third year.**

- The **net worth of the bidder** as on the last date of the previous financial year, as specified in the tender document **should be equal to or greater than Rs 15 crore per thousand MT per annum** of quoted production and supply capacity of green hydrogen.

Monitoring committee:

- A **scheme monitoring committee,** co-chaired by the **secretary of MoPNG, secretary of the MNRE, mission director of the National Green Hydrogen Mission,** and other experts, will periodically review the implementation status and performance of capacities awarded or established under the scheme. The committee will also facilitate and recommend measures to address challenges.

Greenwashing concerns in Green Hydrogen production:

- Environmental organisations have cautioned about **potential land-use and water conflicts** arising from the **significant land and water resources required for green hydrogen production**.

- **Greenwashing** is a **deceptive practice** where companies or even governments **exaggerate their actions and their impact on mitigating climate change,** often providing **misleading information** or **making unverifiable claims.**

- It is an attempt to capitalize on the growing demand for environmentally sound products.

Topic 40. GREENLAND HAS LOST 20% MORE ICE THAN PREVIOUSLY THOUGHT: STUDY

Important for the subject: Environment

Climate change has caused Greenland's ice sheet to lose 20% more ice than previously thought, according to research published that used **satellite imagery** to track the retreat of glaciers over the past four decades.

Reasons for Melting:

- **About 80% of thinning of ice** can be attributed to weather-related factors such as winds that break up and move the ice around.

- **The remaining 20%** can be attributed to longer-term thinning of the ice due to global warming

Impact of Melting Arctic Ice:

- **Global Climate:** The glaciers act like the world's refrigerator. Since they are covered in white snow and ice that reflect heat back into space (Albedo effect), they balance out other parts of the world that absorb heat.

- **Coastal Communities:** Global average sea level has risen by about 7-8 inches since 1900, and it's getting worse. Rising seas endanger coastal cities and small island nations by exacerbating coastal flooding and storm surge.

- **Food Security:** Polar vortexes, increased heat waves, and unpredictability of weather caused by ice loss are already causing significant damage to crops on which global food systems depend.

- **Permafrost & Global Warming:** Permafrost in the Arctic region (ground that is permanently frozen) stores large amounts of methane, which is a greenhouse gas that contributes to climate change.

- **Biodiversity Threat:** Melting of the ice puts the region's vibrant biodiversity under serious threat.

Topic 41. ANOTHER CHEETAH 'SHAURYA' DIES AT KUNO; 10TH DEATH SO FAR

Important for the subject: Environment

Another **cheetah** brought to **India** from **Namibia** died on January 16, 2024, at **Kuno National Park** in **Madhya Pradesh**. **Freddie,** rechristened as **Shaurya,** was brought to **India** in **September 2022**.

- **Eight cheetahs** had arrived from **Namibia** — **three males** and **five females** in September 2022. Another batch of a **dozen cheetahs** — **seven males** and **five females** — reached **India** from **South Africa** for the **introduction of the wild cats** in the country.

- Now, **13 adult cheetahs** remain at **Kuno**, **six males** and **seven females**. Among the **cubs,** there is a **single female** from the **first litter born** in March 2023 and **three more born** late in December 2023.

African Cheetah	Asian Cheetah
• IUCN status – Vulnerable	• IUCN Status – Critically Endangered.
• CITES status – Appendix-I of the List. This List comprises of migratory species that have been assessed as being in danger of extinction throughout all or a significant portion of their range.	• CITES – Appendix I of the list
• Habitat – Around 6,500-7,000 African cheetahs are present in the wild.	• Habitat – 40-50 found only in Iran.
• Physical Characteristics – Bigger in size as compared to Asiatic Cheetah.	• Physical Characteristics – Smaller and paler than the African cheetah. Has more fur, a smaller head and a longer neck. Usually have red eyes and they have a more cat-like appearance.

Kuno National Park:

- It was established in **1981**, as a **wildlife sanctuary** in the **Sheopur** and **Morena districts.** It was also known as **Kuno-Palpur** and **Palpur-Kuno Wildlife Sanctuary.**

- In **2018**, it was given the status of a **National Park**. It is part of the **Khathiar-Gir dry deciduous forests ecoregion**.

- The protected area is largely a **dry deciduous forest**.

Topic 42. ARUNACHAL PRADESH'S PAKKE PAGA HORNBILL FESTIVAL GEARS UP FOR ITS 9TH EDITION

Important for the subject: Environment

The **9th edition** of the **Pakke Paga Hornbill Festival (PPHF),** a **state festival of Arunachal Pradesh,** will take place at **Seijosa** in the **PakkeKessang district** from January 18-20, 2024.

About Pakke Paga Hornbill Festival (PPHF):

- The festival focuses on **wildlife conservation,** with a particular emphasis on **hornbills**. The **first-ever PPHF** was held on **January 16-18, 2015.** The area is also home to the **Nyishi,** the **largest tribal group** in **Arunachal Pradesh.**

- The **aim** was to recognise the role played by the **Nyishi** in conserving **hornbills** in **PTR.** The **Nyishi** had formerly hunted **hornbills** and **used their bills to craft traditional headgear**. They had later turned **hornbill conservationists.**

- Other **objectives** were to **raise alternative sources of income** for the region and to **create awareness in the rest of India about the wonders of PTR** and its surrounding areas.

- This year, the festival's **theme** is **DomutohDomutoh, Paga hum Domutoh.** It translates to **'Let Our Hornbills Remain'** in the **Nyishi language**. This year's festival **aims** to underscore the critical need for preserving these iconic birds.

About Pakke Tiger Reserve (PTR):

- **Pakke Tiger Reserve** is a **Project Tiger reserve** in the **East Kameng district of Arunachal Pradesh** in **Northeast India.** The reserve is protected by the **Department of Environment and Forest of Arunachal Pradesh.**

- It was known as **Pakhui Tiger Reserve** but was renamed in April 2001 by the **Governor of Arunachal Pradesh.**

- It has won the **India Biodiversity Award 2016** in the category of **'Conservation of threatened species'** for its **Hornbill Nest Adoption Programme.**

- **Four species of the birds** — **Wreathed, Great Indian, Oriental Pied** and the **endangered Rufous-necked** — are found in the **Pakke Tiger Reserve (PTR)** of **Arunachal Pradesh**.

**About Hornbill bird:**

- Hornbills are birds found in **tropical** and **subtropical Africa, Asia** and **Melanesia** of the family **Bucerotidae**.

- They are characterized by a **long, down-curved bill** which is frequently brightly coloured

and sometimes has a horny casque on the upper mandible.

- Hornbills have a **two-lobed kidney.** They are the **only birds in which the first and second neck vertebrae (the atlas and axis respectively) are fused together;** this probably provides a more stable platform for carrying the bill.

- The family is **omnivorous,** feeding on **fruit and small animals.** They are **monogamous** breeders **nesting** in **natural cavities in trees** and sometimes cliffs.

- In the **Neotropical realm**, **toucans** occupy the **hornbills' ecological niche,** an example of **convergent evolution.**

- Despite their close appearances, the two groups are not very closely related, with **toucans** being **allied with the woodpeckers, honeyguides** and several families of **barbet**, while **hornbills** (and their close relatives the **ground hornbills**) are allied with the **hoopoes** and **wood-hoopoes**.

Topic 43. NEW BUTTERFLY SPECIES ENDEMIC TO WESTERN GHATS DISCOVERED IN KARNATAKA

Important for the subject: Environment
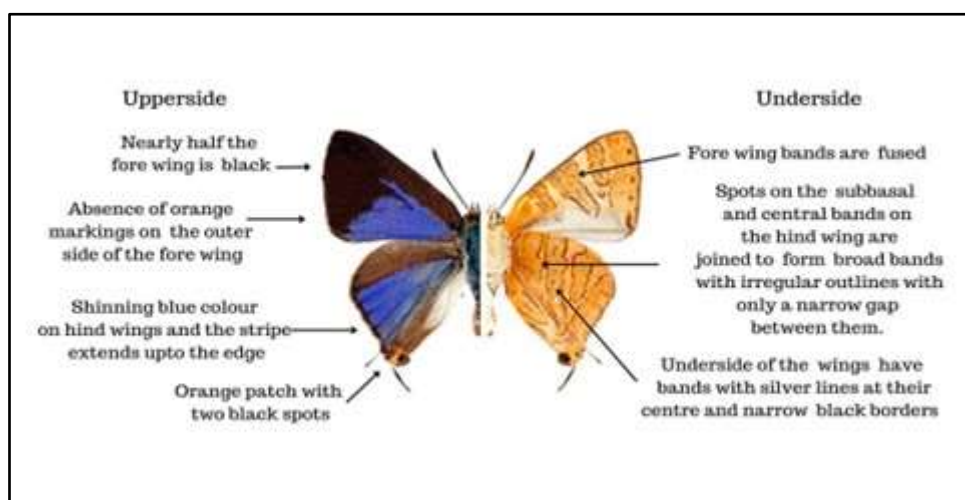
Cigaritis conjuncta or the Conjoined Silverline butterfly:

- Researchers from the **National Centre for Biological Sciences (NCBS-TIFR)** in **Bengaluru,** in collaboration with the **Indian Foundation for Butterflies Trust,** have identified a **new species of silverline butterfly** in **India's Western Ghats biodiversity hotspots.**

- Named **Cigaritis conjuncta** or the **"conjoined silverline,"** the butterfly was initially spotted in **2008** at the **Honey valley, Kodagu district of Karnataka**.

- The discovery includes distinctive features such as a **black upper wing** with **shiny**

blue on the **lower wings,** an **orange patch** with **two black spots,** and unique patterns on the underside, including **fused bands** and **silver lines.**

- The **conjoined silverline** is the **second endemic species** discovered in the **Western Ghats** and prefers **dense mid-elevation evergreen forests**.

- The researchers identified **30 individuals** during their field research, highlighting its specialized habitat preferences.

- In **India**, there are **16 species** of **silverline butterflies**, with **11** of them found in both **peninsular India** and **Sri Lanka.**

Topic 44. WITH JUST TWO SPEAKERS, A LANGUAGE IN KERALA WITH NO SCRIPT IS ON THE BRINK OF EXTINCTION

Important for the subject: History

Kookanam's **Chakaliya community** in Kerala faces the extinction of **Madhika**, a unique language. UNESCO classifies languages in its **'Atlas of Endangered Languages'**.

About Madhika Language :

- Madhika Language have similarities to Kannada language.

- Madhika combines Telugu, Tulu, Kannada, and Malayalam, adding complexity.

Reason of decline :

- The disappearance of Madhika is attributed to the lack of interest, script, educational promotion, social stigma, and a dominating Malayalam language.

About Chakaliya community

- Chakaliya community, initially recognized as Scheduled Tribe, later included in the Scheduled Caste category in Kerala.

- Nomadic and worshipers of Thiruvenkatramana and Mariamma, they migrated from Karnataka centuries ago.

- Social stigma associated with the community and neglect contribute to Madhika's decline.

What are the Constitutional Provisions Related to Languages in India?

- **Article 29:** It protects the interests of minorities. It ensures that all citizens have the right to preserve their distinct language, script, or culture.

- **Eighth Schedule:** It lists the official languages of the republic of India. Part XVII of the Indian constitution deals with the **official languages in Articles 343 to 351.** The Eighth Schedule of the Indian Constitution **recognizes 22 official languages**.

- **Six languages in India currently have 'Classical' status** listed in the Eighth Schedule of the Constitution.

- **Article 343:** It states that the official language of the Union government is **Hindi in Devanagari script, and numerals should follow the international form** of Indian numerals.

- **Article 345:** The legislature of a State may by law adopt any one or more of the languages in use in the State or Hindi as the Language or Languages to be used for all or any of the official purposes of that State.

- **Article 346:** It recognizes India's linguistic diversity by allowing multiple languages to be used in official communications. It also provides a mechanism to ensure effective communication between states and between a State and the Union.

- **Article 347:** It gives the President the power to recognise a language as an official language of a given state, provided that the President is satisfied that a substantial proportion of that state desires that the language be recognised. Such recognition can be for a part of the state or the whole state.

- **Article 348(1):** It provides that all proceedings in the Supreme Court and in every High Court shall be in English language until Parliament by law otherwise provides.

- **Article 348(2):** Provides further that notwithstanding the provisions of Article 348(1), the Governor of a state may, with the previous consent of the President, authorise the use of Hindi or any other language used for any official purpose, in proceedings in the High Court.

- **Article 350:** Every person shall be entitled to submit a representation for the redress of any grievance to any officer or authority of the Union or a State in any of the languages used in the Union or in the State, as the case may be.

- **Article 350A** of the Indian Constitution provides that every state must provide primary education in a mother tongue.

- **Article 350B** provides for the appointment of a "**Special Officer**" for linguistic minorities.

- **Article 351:** It gives power to the union government to issue a directive for the development of the Hindi language.

Topic 45. FEATURES OF AYODHYA TEMPLE

Important for the subject: History

India's Ayodhya Ram Mandir temple inaugurated by the Prime Minister. On 22 January 2024 the Prime Minister of India, served as the **MukhyaYajman** of rituals for the event and performed the **Prana Pratishtha of Ram Lalla** at the temple.

About the architecture:

- The original design for Ram Mandir was devised in **1988 by the Sompura family of Ahmedabad**.

- The Sompuras have contributed to the design of over 100 temples worldwide for at least **15 generations, including the Somnath temple.**

- The chief architect of the temple was **Chandrakant Sompura**, assisted by his two sons, Nikhil Sompura and Ashish Sompura, who are also architects.

- The temple's main structure will be built on a r**aised platform with three storeys.** It will hav**e five mandapas in the middle of the garbhagrih**a (sanctum sanctorum) and on the entrance passage.

- Three mandapas on one side shall be of **Kudu, Nritya and Rang,** and the two mandapas on the other side will be of **Kirtan and Prarthana.** In **Nagara style**, the mandapas are to be decorated with shikhara.

Features of the temple:

- The temple is being built in traditional **Nagara style.** The length of the temple (east to west) will be 380 feet, width 250 feet and height 161 feet.

- The temple will be **three-storeyed.** The height of each floor will be **20 feet.** There will be a total of **392 pillars and 44 gates** in the temple.

- There will be an idol of **Shri Ramlalla Sarkar** in the main sanctum and Shri Ram Darbar on the first floor.

- There will be five pavilions in the temple: d**ance pavilion, color pavilion, assembly pavilion, prayer pavilion and kirtan pavilion.**

- Artworks of gods and goddesses are being carved on the **pillars and walls.** Entry to the temple will be from the east side by climbing 32 stairs from Singhdwar.

- A rectangular wall is being **built around.** the temple. Its total length in all four directions will be 732 meters and width will be 14 feet.

- Four temples dedicated to **Surya Bhagwan, Maa Bhagwati, Ganapati and Bhagwan Shiva will be built on the four corners of the park.**

- There will be a temple of **Maa Annapurna in the northern arm and Hanuman ji** temple in the southern arm. **Sitakoop** of ancient times will be present near the temple.

- Other temples proposed in the temple complex will be dedicated to **Maharishi Valmiki, Maharishi Vashishtha, Maharishi Vishwamitra, Maharishi Agastya, Nishadraj, Mata Shabri and Rishipatni Devi Ahilya.**

- The ancient temple of **Bhagwan Shiva on Navratna Kuber Tila** in the **south-western** part has been renovated and a Jatayu statue has been installed there.

Technological Aspects:

- To protect the temple from soil moisture, a **21 feet high plinth has been made of granite.**

- **14-meter thick roller-compacted concrete** has been laid under the temple. It has been given the form of an artificial rock. **Ramps and lifts** have been arranged in the temple for the disabled and elderly.

- **Sewer treatment plant, water treatment plant, water system for fire fighting and independent power station** have been constructed independently in the temple complex, so that there is minimum dependence on external resources.

- A **Visitor Facilitation Center** with a capacity of 25,000 is being constructed, where there will be lockers for keeping the luggage of the visitors and medical facilities. Facilities of bathroom, toilet, wash basin, open taps etc. will also be available in the temple premises.

- The temple is being constructed completely **according to Indian tradition and with indigenous technology.**

- Special attention is being given to the **environment and water conservation**. Of the total area of 70 acres, **70 percent of the area will always be green.**

Topic 46. HOW RAMAYANA BECAME POPULAR OUTSIDE INDIA, FROM EAST ASIA TO THE CARIBBEAN

Important for the subject: History

India's PM Narendra Modi has inaugurated a grand temple to Hindu god Ram in the flashpoint city of Ayodhya. The **Ramayan**a is an ancient Indian epic which was composed some time in the **5th century BCE.** It is about the exile and then return of **Rama, prince of Ayodhya.** It was composed in Sanskrit by the **sage Valmiki**, who taught it to Rama's sons, the twins Lava and Kush.

The Ramayana is a smriti text from ancient India and is one of the **two important epics of Hinduism known as the Itihasas, the other being the Mahabharata.**

How the Ramayana spread in Asia

- The Ramayana traveled from India to the rest of Asia in "the early centuries of the Christian era" along three routes. By land i.e. the northern route took the story from **the Punjab and Kashmir into China, Tibet, and East Turkestan.**

- By sea i.e. the southern route carried the story from **Gujarat and South India into Java, Sumatra, and Malaya.**

- By land i.e. the eastern route delivered the story from **Bengal into Burma, Thailand, and Laos. Vietnam and Cambodia** obtained their stories partly from Java and partly from India via the eastern route.

- The Ramayana became an integral part of the culture of many of these countries. In

Thailand the **Ayutthaya kingdom** (1351 to 767) is believed to have been based on the Ayodhya of the Ramayana.

- In Cambodia**, the Angkor Wat temple complex**, built in the 12th century, features murals from the Ramayana, and was originally a temple dedicated to Vishnu.

How it survives in the region today:

- The Ramayana remains an important part of the culture of many of these Southeast Asian countries, though the dominant religions range here from **Buddhism (for eg. Cambodia, Laos) to Islam (Malaysia, Indonesia).**

- The **Ramakien**, a version of the Ramayana, is Thailand's national epic. The current king belongs to the Chakri dynasty, whose rulers are all named after Ram. **Vajiralongkorn**, the current constitutional monarch, is styled Rama X.

- **Thai Ramakien** owes much to the Tamil epic i.e. Kamban Ramayan. In **Laos** too, the story of Phra Ram is the national epic.

Differences between Indian epic and Other countries Ramayan:

- In **Cambodia's Reamker, a mermaid princess Suvannamaccha** falls in love with **Lord Hanuman. In Java, the Javanese deity Dhayana** and his sons become part of the story.

- The **Malaysian Hikayat Seri Ram**a is more sympathetic to **Ravana (Maharaja Wana).** In **Laos, Phra Ram** is considered a previous incarnation of **Gautama Buddha.**

Ramayana outside Asia:

- A major current that took the **Ramayana to Africa,** the Caribbean, etc. was the **girmitiya migration** outside India in the 19th century.

- The **girmitiyas** were not rich traders likely to influence kings, but there is a **more personal element in how they remembered and preserved the tale of Ram**

- In an alien land, the **Ramcharitmanas** became a source of succor, of nostalgia, the symbol of a homeland more real than the actual home.

About Girmitiya:

- The word 'girmitiya' comes from 'agreement', which these people signed (or were made to sign) to work in the plantations.

- Girmitiyas also known as Jahajis are the indentured laborers from British India transported to work on plantations in **Fiji, South Africa, Eastern Africa (namely Mauritius, Seychelles, Réunion, Tanzania, Kenya, and Uganda), Malaysia, Singapore, and the Caribbean (namely Trinidad and Tobago, Guyana, and Suriname**) as part of the Indian indenture system.

- Majority of these girmitiya laborers were from **Uttar Pradesh and Bihar.** They carried their culture and religion along with them and a large part of this culture was **Tulsidas's**

Ramcharitmanas, written in Awadhi and arguably the most popular religious text in North India.

Versions of Ramayana:

- **Uttar Pradesh (Awadh)** – The **Ramcharitmanas was written by Goswami Tulsidas** in the 16th century.

- **Tamil Nadu** – The Tamil **Kambaramayanam, a popular version, written by poet Kamban** in the 12th century.

- **Odisha** – The **Jagamohana Ramayana or Dandi Ramayana composed by Balarama Dasa** in the early 16th century.

- **Maharashtra** – The **Marathi Bhavartha Ramayana written by Sant Eknath** in the 16th century.

- **Andhra Pradesh** – The **Sri Ranganatha Ramayanam was adapted by Gona Budda Reddy** and is the Telugu version of the Ramayana between 1300 and 1310 CE.

- **Bengal** – The Bengali **KrittivasiRamayan written by Krittibas Ojha** in the 15th century.

Places mentioned in Ramayana:

Ayodhya, Uttar Pradesh:

- Believed to be Rama's birth place, it has numerous temples and sites linking it to the Ramayana.

- **Kanak Bhawan Temple, Hanuman Garhi Temple, Sarayu River ghat are places of attraction.**

Prayag, Uttar Pradesh

- Prayag, the modern-day Allahabad, is where Rama met Rishi Bhardwaja to receive his blessings and wisdom to survive the trials he was to face during the 14-year-long exile. On his return from Sri Lanka, Rama and his retinue landed at the ashram of Sage Bhardwaja once again before moving onward for Ayodhya.

Bhardwaj Ashram, Mankameshwar Temple, Shringverpur are places of attraction.

Chitrakoota, Madhya Pradesh

- One of the most important stops in the journey, Chitrakoot is believed to have housed Rama, Sita and Laxmana for more than 11 years during their exile from Ayodhya.

- It was here Rama and Sita met one of the seven immortal sages, Atri and his chaste wife Anusuya Devi.

- **Ramghat, Hanuman Dhara, Kamadgiri, Janki Kund, Sphatik Shila, Gupt Godavari, Sita ki Rasoi, Devi Anusuya Temple are places related to Lord Rama.**

Panchavati, Nashik

- A once-upon-the-time forest, Panchavati housed the trio for some time. It was here that Lakshmana cut off the nose of demoness Surpanakha, the sister of Ravana.

Kala Ram temple, Sita Gufa, Tapovan, Ram Kund are places of attraction.

Lepakshi, Andhra Pradesh

- Lepakshi is believed to be the spot where Jatayu, the holy giant bird that tried to rescue Sita from Ravana's throes, fell lifeless after his fight with the demon king. Before dying, he narrated the incident to Rama and Laxmana and guided them towards Lanka.

Lepakshi Temple is the most revered site present here.

Kishkindha, Karnataka

- Now known as Hampi, this highly popular place is supposedly the meeting point of Rama and Sugriv, the monkey king who helped Rama in his battle with Ravana.

Pampa Sarovar is located in this place.

Rameshwaram, Tamil Nadu

- Perhaps the most famous of all the sites, Rameshwaram is the site where the fabled bridge between India and Sri Lanka was built by Rama's army. Before embarking on this mission to cross the sea for Lanka, Rama installed a Shiva Lingam and worshiped it with full devotion.

Ramanathaswamy Temple is present here.

Ashoka Vatika, Sri Lanka

- Ashoka Vatika, now famous as the site of the sacred Sita Amman Temple in Sri Lanka, is where Ravana kept Sita after abducting her. This place is located in the beautiful region named Nuwara Eliya.

- **Sita Amman Temple, Divurumpola (Sita underwent the fire ordeal here) are few revered sites present here.**

Talaimannar, Sri Lanka

- The battle site of Ramayana, this is where Rama killed Ravana and rescued Sita.

- Thereafter, at Rama's behest, Lakshmana installed Ravana's brother Vibhishana as the King of Lanka. Soon after, Sita, Rama and Lakshmana started for Ayodhya to reunite with their family.

- Eventually, the reunion led to the celebrations we now know as Diwali.

Topic 47. FROM KAUSALYA'S LAND, RAM SETU SARI UNFOLDS RARE WEAVE

Important for the subject: History

Odisha's **Sambalpuri weavers** hope Ram Temple inauguration will change the fortunes of their saris made on mythological themes.

More About Ram Setu Sari

- A 2015 National Award winning master craftsperson, **Ishwar Meher** worked with handwoven cotton yarn for five months, using natural dyes from flowers, jaggery, gram flour, iron rust, and indigo.

- He designed the piece in **Sambalpuri baandhakala ikat**, a technique in which the warp and the weft are tied and dyed before weaving.

- The sari will now be showcased at the Jagannath Temple in Delhi on January 22, since Hindus believe Ram is one of the 10 avatars of Jagannath.

Various Awards in Textiles

Shilp Guru Award

- The Shilp Guru awards are conferred by Government of India every year on legendary master crafts persons of handicrafts whose work and dedication have contributed not only to the preservation of rich and diverse craft heritage of the country but also to the

resurgence of handicrafts sector as a whole. Each award consists of one mounted gold coin, one shawl, certificate and a 'tamrapatra'.

- In addition, financial assistance of Rs.6 lakh is also given to each awardee to innovate and create five new products of high level of excellence, high aesthetic value and high quality befitting the stature of the Guru.

Sant Kabir award

- The Sant Kabir Award is conferred by Government of India every year on outstanding weavers who have made valuable contribution in keeping alive the handloom heritage and also for dedication in building up linkages between the past, present and future through dissemination of knowledge on traditional skills and designs.

- Each award consists of one mounted gold coin, one shawl, a certificate and a 'tamrapatra'.

- Financial assistance of Rs. 6 lakh is also given to each awardee to innovate and create 10 new products of high level of excellence, high aesthetic value and high quality.

National Awards for Master Crafts persons and master weavers

- The National Awards for Master Crafts persons and master weavers were introduced in 1965 by Government of India. Each award comprises a cash prize of Rs.1 lakh, a certificate, a 'tamrapatra' and an 'angavastram'.

Topic 48. WHAT IS THE NAGARA STYLE, IN WHICH AYODHYA'S RAM TEMPLE IS BEING BUILT

Important for the subject: History

The Ram temple in Ayodhya which is to be inaugurated **on January 22**, has been designed

in the Nagara style of temple architecture.

Meru, Mandara and Kailasa are the f**irst three names amongst the twenty types of temples** described in the early texts **as the names of the Mountain,** which is the axis of the world. **One of Ayodhya's Ram temple's 'hybrid' features** is that although no elaborate gopuram has been built in the temple, **a 732m long wall runs** around the temple compound.

About Nagara Style of temple architecture:

- The **Nagara style of temple architecture emerged sometime in the fifth century CE**, during the late Gupta period, in northern India. The **Dravidian style of southern India also emerged in the same period.**

- Nagara and Dravida which are called 'styles' are also called **"the two great classical languages of Indian temple architecture".**
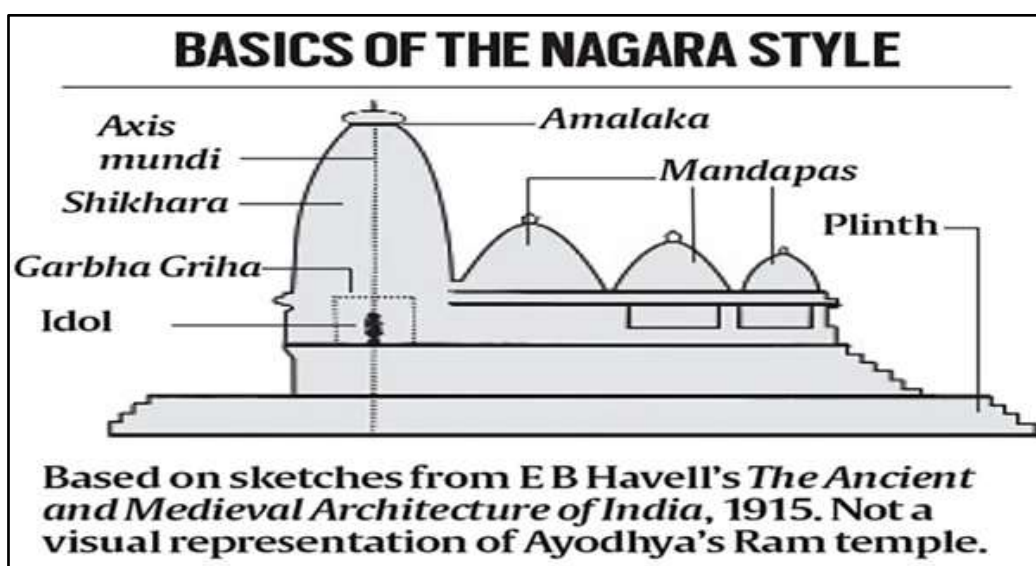
Distinguished by a towering shikhara

- **Nagara temples** are built on a raised plinth with the **garbhagriha also known as "sanctum sanctorum" where the idol of the deity rests.**

- It is considered as the most sacred part of the temple. Towering over the **garbhagriha is the shikhara,** referred to as '**mountain peak' and is considered as the most distinguishable aspect of Nagara style temples.**

- **Shikharas** are human-made representations of the natural and cosmological order, as imagined in Hindu tradition.

- A typical Nagara style temple also comprises a **circumambulatory passage** around the **garbhagriha meant for parikrama.** It has o**ne or more mandapas (halls)** on the same axis. **Elaborate murals and reliefs** often adorn its walls.

Five modes of Nagara architecture

- There are **five modes of Nagara temple architecture** —

- **Valabhi, Phamsana, Latina, Shekhari, and Bhumija.** The **first two i.e Valabhi and Phamsana** are associated with what scholars have classified as **Early Nagara Style.**

- The **Valabhi begins as a masonry rendering of the barrel-roofed wooden structure**, simple or with aisles, familiar through chaitya halls. **A formalization of multi-eave towers** leads to the **Phamsana style.**

- From these modes e**merged the Latina where a shikhara is a single, slightly curved tower with four sides of equal length.** This **mode emerged in the Gu**pta period and **was complete with curvature by the early seventh century.**

- The **tenth century onwards composite Latinas bega**n to emerge and **gave rise to Shekhari and Bhumija styles.** The **Shekhari shape has attached sub-spires or**

spirelets echoing the main shape.

- These may run up most of the **face of the shikhara.** The **Bhumija has miniature spires** which are in **horizontal and vertical rows** and run all the way to the top, **creating a grid-like effect on each face.**

- The actual shikhara often approaches a **pyramidal shape,** with the **curve of the Latina less visible.**

- Temples can even contain **multiple kinds of shikaras on top of a simple structure,** with the tallest always being on top of the garbha griha.

BASICS OF THE NAGARA STYLE

Axis mundi — Amalaka
Shikhara — Mandapas
Garbha Griha — Plinth
Idol

Based on sketches from E B Havell's *The Ancient and Medieval Architecture of India*, 1915. Not a visual representation of Ayodhya's Ram temple.

Dravidian temple Architecture:

Basic features of the Dravida Style of temple architecture are as follows:

- The **tower in Dravida Style is known as 'Vimana'** and is a **pyramidal structure with sliding sides.**

- **'Vimana' is not only created on the 'Garbhagriha'** but also on the 'Gopurams'. **'Gopurams'** is an entrance gateway. **Boundary wall** is a necessary feature.

- Presence of **water tank** within the premise which is meant for religious ablutions. They like the **'Nagara' style, also follow the 'Panchayatan' style and crucified ground plan**.

- At the entrance of **'Garbhagriha' images of 'Dwarapala'** are placed to guard the temple. In some temples images of **embracing couples (mithun) are placed.**

- The **'Garbhagriha' is connected through a very small passage known as 'Antaral' to the 'Mandapa'.**

Gangaikondacholapuram temple
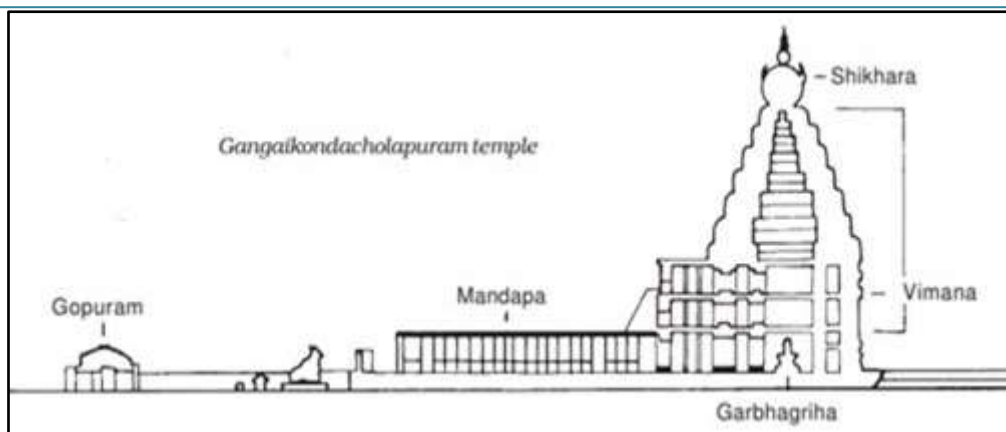
Comparison to Dravida style

- The Dravida counterpart to the **shikhara is the vimana.** In the Dravida style temples, vi**manas are typically smaller than the great gatehouses or gopurams.**

- **Gopurams** are the most striking architectural elements in a temple complex. **Shikhar as mentioned in southern Indian architectural sources**, refers only to the dome-shaped crowning cap atop the vimana.

- The **existence of gopuram**s also points to another unique feature of the Dravida style **i.e. the presence of a boundary wall.**

- **Few Nagara style temple complexe**s are lined with **distinctive boundary walls** that are a part of the temple's design.

Topic 49. PM RELEASES POSTAGE STAMPS ON RAM TEMPLE, STAMP BOOK ON RAMAYANA

Important for the subject: History

The Prime Minister released **commemorative postage stamps on the Ram temple**, along with a book of stamps on the Ramayana from around the world.

- These tickets are the **smallest form of history books, artefacts and historical sites and serve as a miniature form of epics and great ideas.**
- Components of the design include the under construction Ram Temple, the **chaupai- 'Mangal Bhavan Amangal Hari',** the Saryu river flowing through Ayodhya, and the sculptures in and around the temple.

- The 48 page stamp book includes stamps issued by more than **20 countries,** including the U.S., New Zealand, Singapore, Canada, Cambodia, and organisations such as the UN.

About Commemorative Stamps

- Commemorative stamps are issued for marking:

- Important events

- Prominent personalities in various fields

- Aspects of nature

- Beautiful or rare flora and fauna

- Environmental issues

- Agricultural activities

- National/international issues

- Games

- No formal release function for a stamp can be held without specific prior approval from the **Department of Posts**.

- These stamps are only available at **Philatelic Bureaux** and counters or under the **Philatelic Deposit Account Scheme.** They are **printed in limited quantities.**

Topic 50. THE LEGACY OF SHANKARACHARYA

Important for the subject: History

Adi Shankara

One of India's greatest philosopher-sages, Shankaracharya was born in a Namboodiri Brahmin family.

- Adi Shankara took to contemplation and Vedantic studies at an early age and completed his gurukul studies in eight years.

- He went on a journey through India, propagating Vedantic Advaita. He firmly established Vedanta in India—all in a short span of 32 years.

- **Four Peethas:** For spreading Vedanta, Adi Shankaracharya established four peethas (monasteries) in the four corners of the country, under the leadership of his four chief disciples.

- Their successors are heads of these peethas today. Two upa-peethas were also established in Kashi and Kanchi.

Shankaracharya Peethas

- **Sharda Peetha, Sringeri (Karnataka):** Adi Shankaracharya set up his first peetha here for South India
  Current Head: Shri Bharati Teertha

- **Kalika Peetha, Dwarka (Gujarat):** Also called Sharada peetha, established in the western corner of the country
  Current Head: Swami Swaroopanandji

- **Govardhan Peetha, Puri (Orissa):** Established in the eastern corner of the country by Adi Shankaracharya
  Current Head: Swami Nischalanandaji

- **Jyotir Peetha, Joshimath (Uttaranchal):** For north India, established near Badrinath
  Current Head: Swami Vasudevanandaji

- **Kamakoti Peetha, Kanchi (TN):** Upa-peetha where Adi Shankaracharya used to perform "linga puja"
  Current Head: Swami Jayendra Saraswati

- **Kashi Sumeru Peetha, Varanasi (UP):** Upa-peetha (not recognised by some Hindu organisations)
  Current Head: Swami Narendranandji

Who becomes Sankaracharya?

- "Shankaracharya" is a traditional title for head of the peetha. It is handed over to the disciple by the incumbent Shankaracharya.

- The person should be a Brahmin by birth and a master in Yoga. He should be well-versed in Vedanta and must be recognised by the other three Shankaracharyas.

Topic 51. MUSEVENI REGRETS INDIANS' EXPULSION BY IDI AMIN IN 1970S

Important for the subject: International Relations

Nearly **52 years** after **Ugandan dictator Idi Amin expelled the Indian community from Uganda, President Yoweri Museveni** acknowledged the decision as a **mistake** and expressed gratitude for the **Indian community's contributions to Uganda.**

This **rare expression of regret** was made at the **19th Non-Aligned Movement (NAM) summit 2024** in **Kampala, Uganda,** acknowledging the historical trauma inflicted on the **Indian diaspora**.

Expulsion of Asians from Uganda in 1970s:

- In **August 1972, Idi Amin** ordered the **expulsion of around 80,000 Indians,** as well as **thousands of Pakistanis** and **Bangladeshis**, who had been **integral to Ugandan society**.

- The expulsion took place **against the backdrop** of **anti-Indian sentiment** and **black supremacy in Uganda,** with **Amin accusing a minority of the Indians** of **disloyalty, non-integration, and commercial malpractice,** claims that **Indian leaders disputed.**

- **Amin** defended the expulsion by arguing that he was **"giving Uganda back to ethnic Ugandans".**

- This expulsion impacted many, including individuals like **former U.K. Home Secretary Priti Patel,** who trace their roots back to **Uganda** during **Amin's regime.**

- **President Museveni,** speaking at the **NAM summit,** highlighted the **Indian community's role** in **Uganda's economic development,** noting that the convention centre where the summit was held was built by one of those affected by Amin's decision.

Non-Alignment Movement (NAM):

- **NAM** is a forum that is **not formally aligned with or against any major power bloc.** After the **United Nations**, it is the **largest grouping of states worldwide.**

- Drawing on the **principles** agreed upon at the **Bandung Conference in 1955**, the **NAM** was established in **1961** in **Belgrade, Yugoslavia** through the **initiative** of **President of Yugoslavia Josip Broz Tito, President of Egypt Gamal Abdel Nasser, Prime Minister of India Jawaharlal Nehru, President of Indonesia Sukarno,** and **President of Ghana Kwame Nkrumah.**

- After the breakup of **Yugoslavia,** a **founding member,** its **membership** was suspended in **1992** at the regular ministerial meeting held in **New York** during the **regular annual session of the United Nations General Assembly.**

- As of **October 2019,** the organization consists of **120 member states,** including the **non-UN member state of Palestine,** as well as **17 other observer countries** and **10 observer organizations.**

- Approximately, **two-thirds** of the **United Nations' members** are represented in the **Non-Aligned Movement,** and they comprise **55%** of the **world's population**.

Topic 52. AT LEAST 25 KILLED IN UKRAINIAN STRIKES ON RUSSIAN-CONTROLLED DONETSK

Important for the subject: International Relations

At least 25 people were killed and 20 were injured, including two children, in Ukrainian

shelling near a market in the Russian-controlled city of Donetsk in eastern Ukraine

Kyiv once again committed a barbaric terrorist act against the civilian population of Russia.

- Donetsk is one of four Ukrainian regions that Moscow said in 2022 it would recognize as Russian territory – an annexation process which is illegal under international law.

- Kyiv's troops have withdrawn from the village of Krokhmalne in the northeast of the country, close to the border between Kharkiv and Luhansk regions

- Russia had captured the village of Krokhmalne in the Kharkiv region of Ukraine.

Ukraine strikes oil terminal in Russia:

- Ukraine carried out a drone attack on a Russian oil terminal about 100 kilometers (62 miles) west of Saint Petersburg.

- A significant fire broke out at the Chemical transport terminal Novatek facility in Ust-Luga(at Baltic sea terminal), which sits on the Gulf of Finland.

- The blaze was at site of Russia second largest natural gas terminal ieNovatek(south west of St Petersburg)

About Baltic sea:

- The Baltic Sea is an arm of the Atlantic Ocean that is enclosed by **Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland, Russia, Sweden, and the North and Central European Plain.**

- The Baltic Sea is connected by artificial waterways to the **White Sea via the White Sea–Baltic Cana**l and to the **German Bight of the North Sea via the Kiel Canal.**

About Gulf of Finland:

- The Gulf of Finland is the **easternmost arm of the Baltic Sea.**

- It extends between **Finland to the north and Estonia to the south, to Saint Petersburg in Russia to the east where the river Neva drains into it.** Other major cities around the gulf include **Helsinki and Tallinn.**

Areas in news:

Ukraine:

1. Donetsk,

2. Kharkiv,

3. Krokhmalne,

4. Luhansk.

Russia:

- Ust Luga.

Topic 53. ISRAELI STRIKE ON DAMASCUS KILLS 4 IRANIAN REVOLUTIONARY GUARDS

Important for the subject: International Relations

An Israeli missile strike on Syria's capital Damascus on Saturday killed four members of Iran's Revolutionary Guards. Israel has long pursued a bombing campaign against **Iran-linked targets in Syria.**

- Tensions have also been **escalating in the Red Sea** amid attacks on commercial ships by the Iran-aligned **Houthi group in Yemen.**

- **US Central Command forces on Saturday** struck a Houthi anti-ship missile that was aimed into the Gulf of Aden and prepared to launch.

- The **Houthis who control most of Yemen,** say their attacks are in solidarity with Palestinians under attack from Israel in Gaza

About Red Sea:

- The **Red Sea is a seawater inlet of the Indian Ocean, lying between Africa and Asia**. Its connection to the ocean in the south is through the **Bab-el-Mandeb strait and the Gulf of Aden.**

- To its north lie the **Sinai Peninsula, the Gulf of Aqaba, and the Gulf of Suez (leading to the Suez Canal).** It is underlain by the **Red Sea Rift** which is part of the Great Rift Valley.

- The six countries bordering the Red Sea are: **Saudi Arabia, Yemen, Egypt , Sudan , Eritrea , Djibouti .**

About Gulf of Aden:

- The **Gulf of Aden** is a deep water gulf of the Indian Ocean between **Yemen to the north, the Arabian Sea to the east, Djibouti to the west, and the Guardafui Channel, Socotra and Somalia to the south.**

- In the northwest, it connects with the Red Sea through the **Bab-el-Mandeb strait.** It connects with the **Arabian Sea to the east.**

- To the west, it narrows into the **Gulf of Tadjoura in Djibouti**. The **Aden Ridg**e lies along the **middle of the Gulf** and is causing it to widen about 15mm per year.

About Houthis Tribes:

- The **Houthi tribe** is a **Hamdanid Arab tribe** that lives in **northern Yemen**. The tribe is a branch from **Banu Hamdan tribe.** They are primarily located in **Amran and Sa'dah.**

- The Houthi movement is named after the tribe. The Houthi movement officially known as **Ansar Allah, is a Shia Islamist political** and military organization that emerged from **Yemen in the 1990s.**

- It is predominantly made up of **Zaidi Shias**, with their namesake leadership being drawn

largely from the Houthi tribe.

- **Yemen** (officially the Republic of Yemen) is a country in West Asia. It is located in the southern end of the **Arabian Peninsula, bordering Saudi Arabia to the north and Oman to the northeast.** It shares maritime borders with **Eritrea, Djibouti and Somalia.**

Topic 54. WHAT ARE LABOUR RULES FOR WORKERS ABROAD?

Important for the subject: International Relations

National Skill Development Corporation (NSDC) is assisting the governments of Uttar Pradesh and Haryana in hiring around 10,000 workers to go to Israel, mainly for construction work.

National Skill Development Corporation (NSDC)

- It is a not-for-profit public limited company that was established in July 2008. The Ministry of Finance established NSDC as a Public Private Partnership (PPP) model.
- The Government of India, through the MSDE (Ministry of Skill Development & Entrepreneurship), holds 49% of the NSDC's share capital, while the private sector holds the remaining 51%.
- Currently, the NSDC is under the MSDE.

Goal

- To improve the skills of people in India. It does this by encouraging private sector initiatives in skill development programs and providing funding.
- To promote skill development by catalysing the creation of large, quality, and for-profit vocational institutions.

Employment in Israel

- There are about 18,000 Indian citizens in Israel, primarily caregivers employed by Israeli elders to take care of them, diamond traders, IT professionals and students.

- According to a 2017 report prepared by the ILO, international migration has grown significantly in the last two decades.

- The number of migrants from Asia to the Arab states has more than tripled, from 5.7 million in 1990 to 19 million in 2015.

Prescribed rules

Registration on e-migrate portal

- Workers going to conflict zones or places without sufficient labour protections are required to register with the **Ministry of External Affairs' 'e-migrate' portal.**

- The e-Migrate Project was **launched in 2014.** The portal is a digital platform that aims to

streamline the emigration process for Indian workers.

- It allows workers to create profiles, register employment contracts, and obtain emigration clearance.

Emigration Check Required (ECR) scheme

- ECR scheme is a passport category for Indian nationals who want to work abroad. ECR passports are issued to **people who have not passed the 10th grade or higher education pass certificate.**

- To work in ECR countries, ECR passport holders must obtain an Emigration Clearance (EC) from the Protector of Emigrants (POE).

- POEs are responsible for granting emigration clearance to intending emigrants. The POEs perform functions assigned to them under the Emigration Act, 1983.

- Currently, passports issued under the ECR scheme cover workers travelling to 18 countries. Israel is not on this list and hence the e-migrate system will not be used for those going to Israel despite continuing violence due to Israel's bombing of Gaza.

Collection of service charges from workers

- The Rules say that no recruiting agent shall collect from the worker service charges more than a maximum of ₹30,000.

- These service charges shall include costs of domestic travel or lodging and boarding for conducting of interviews by the recruiting agent.

International practices

- The international practices for protection of migrant workers are governed by two conventions of the International Labour Organisation:

- the **Migration for Employment Convention (Revised), 1949 and Migrant Workers (Supplementary Provisions) Convention, 1975.**

- While **India has not ratified** both conventions, Israel had ratified the 1949 convention in 1953.

Topic 55. NO RESPITE FOR BRAZIL'S YANOMAMI GROUP FACING ILLEGAL MINING LINKED CRISIS

Important for the subject: International Relations

The **Yanomami Indigenous** group is again facing a severe humanitarian crisis blamed on **illegal gold miners**, despite Brazil's President deploying the military to wrest back control of their territory.

**Who are Yanomami Indigenous people?**

- The indigenous people live in a reserve in **Brazil's northern state of Roraima.** An estimated 28,000 indigenous people live in the Yanomami reserve.

- The Yanomami are the largest relatively isolated tribe in South America. They live in the rainforests and mountains of northern Brazil and southern Venezuela.

- They hunt, practise small-scale slash-and-burn agriculture and live in small, scattered, semi-permanent villages.

- President Luiz Inácio Lula da Silva has accused his predecessor, far-right Jair Bolsonaro, of committing genocide against the **rainforest tribe.** The government declared a medical emergency after hundreds of Yanomami children died from malnutrition.

- In his four years in power, Mr Bolsonaro often criticised the size of the indigenous reserves and promised to open some of them to agriculture and mining.

- His government weakened environmental protections, and critics said his rhetoric emboldened illegal activity in the region.

- Today, some 20,000 illegal miners are estimated to operate inside the Yanomami reserve, which is rich in gold, diamonds and minerals

What has been the impact of illegal mining in Yanomami territory?

- The spread of illegal mines and the arrival of thousands of miners has caused a spike in reported cases of diseases such as tuberculosis and malaria.

- In a 2022 study published in BioMed Central's Malaria Journal, researchers wrote that between 2016 and 2020, the number of malaria cases rose by 1,090 per cent in Indigenous areas and 75,576 per cent in mining areas.

Topic 56. CONSIDER USING DEBT-SERVICE AND DEBT-TO-INCOME RATIOS TO ASSESS RETAIL BORROWERS' VIABILITY: RBI BULLETIN

Important for the subject: Economy
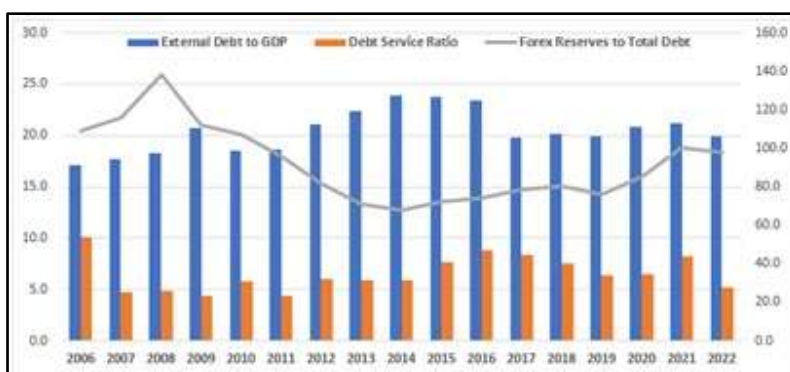
RBI's latest monthly bulletin says that **policymakers** need to consider **structural prudential tools such as debt-service ratio and debt-to-income ratio to assess viability of retail borrowers.**

- There is a **persistent credit growth** in certain segments of retail credit. Risk weights on certain segments of **consumer credit were enhanced by 25 percentage points.**

- Between 2007 to 2023, the share of unsecured advances in **retail credit increased from 25 to 35 per cent.**

- The share of major segments representing the **secured credit remained stable.** The housing loans continue to be the **single largest sub-segment which constitutes around 48 to 50 percent of retail credit.**

- The vehicle loans constituted the **second largest segment accounting for about 10 to 12 percent share.**

Surge in retail credit growth:

- The Indian economy is witnessing a **surge in retail credit growth.**

- Between 2015 to 2023, the personal loans or retail credit registered a **compounded annual growth rate (CAGR) of 17 per cent** in outstanding amounts and **15 percent in borrower accounts.**

- **Non-food credit registered a CAGR of 10 percent** in outstanding amounts and 12 per cent in borrower accounts.

Measures to be adopted

Debt service ratio:

- A **country's debt service ratio** is the ratio of its **debt service payments (principal + interest) to its export earnings.**

- The debt service ratio is o**ne way of calculating the ability to repay debt.** A country's i**nternational finances are healthier** when this ratio is low. For most countries the ratio is between 0 and 20%.

- India's e**xternal debt of $624.7 billion at March-end 2023** with a **debt-service ratio of 5.3%** is within the comfort zone

Debt-Service Coverage Ratio (DSCR)

- The debt-service coverage ratio (DSCR) measures a **firm's available cash flow to pay current debt obligations.**

- The DSCR shows **investors and lenders whether a company** has enough income to pay its debts.

About Debt Income Ratio:

- **The debt-to-income ratio (DTI)** measures a borrower's debt repayment capacity as per their gross monthly income.

- DTI is the **gross of all monthly debt payments** divided by the gross monthly income, calculated as a percentage.

- **The debt-to-income (DTI)** ratio measures the amount of income a person or organization generates in order to service a debt.

- **A low DTI ratio** indicates **sufficient income relative to debt servicing**, and it makes a borrower more attractive.

About Account Aggregator Network:

- **An Account Aggregator (AA)** is a type of **RBI regulated entity (with an NBFC-AA license) that helps an individual securely** and digitally access and share information from one financial institution they have an account with to any other regulated financial institution in the AA network.

Data cannot be shared without the consent of the individual.

- **Account Aggregator** replaces the **long terms and conditions form of 'blank cheque' acceptance** with a granular, step by step permission and control for each use of your data.

Topic 57. AS DAVOS CROWD GATHERS, GOVTS. URGED TO REIN IN 'BILLIONAIRE CLASS'

Important for the subject: Economy

As per Oxfam, the combined fortunes of the world's five richest men have more than doubled to $869 billion since 2020 while five billion people have been made poorer.

- Oxfam called for governments to rein in corporate power by breaking up monopolies; instituting taxes on excess profit and wealth; and promoting alternatives to shareholder control such as forms of employee ownership.

What is Oxfam International?

- Oxfam International is a confederation of 21 independent charitable organizations working together with partners and local communities in more than 90 countries.
- Its mission is to end the injustices that cause poverty. Oxfam works to find practical, innovative ways for people to lift themselves out of poverty and thrive.
- They save lives and help rebuild livelihoods when crisis strikes. They campaign so that the voices of the poor influence the local and global decisions that affect them.

What is World Economic Forum?

- The World Economic Forum (WEF) is a Swiss nonprofit foundation established in 1971, based in Geneva, Switzerland.

- Recognized by the Swiss authorities as the international institution for public-private cooperation known for its Davos summit.

Mission:

- Committed to improving the state of the world by engaging business, political, academic, and other leaders of society to shape global, regional, and industry agendas.
- Founder and Executive Chairman: Klaus Schwab.

Some major reports published by WEF are:

1. Energy Transition Index.
2. Global Competitiveness Report.
3. Global IT Report
4. WEF along with INSEAD, and Cornell University publishes this report.
5. Global Gender Gap Report.
6. Global Risk Report.
7. Global Travel and Tourism Report.

Topic 58. CRISIS CAN IMPACT INDIA AS 80% OF EXPORTS TO EUROPE TAKES PLACE VIA RED SEA: OFFICIAL

Important for the subject: Economy

According to the commerce and industry ministry, the Red Sea shipping crisis could impact India's exports to Europe the most as about **80 per cent of the outbound shipments to Europe takes place through the Red Sea region**. The EU contributes to over 15 per cent of India's total goods exports.

Other reasons for slowdown in exports to Europe

- Russia-Ukraine war

- Environmental related trade measures such as the **carbon border adjustment mechanism** and **EU's deforestation law** are feared to hit India's exports going forward.

Impact of Red Sea disruption

- The cost is increasing due to the Red Sea disruption. But ultimately it will depend on demand.

- The US exports are also through the Suez route. Transport charges are surging. An additional congestion surcharge is also being charged. But if the demand is robust the shipments will go.

- The ministry said that the Red Sea region is vital for 30 per cent of global container traffic and 12 per cent of global trade and about 95 per cent of vessels have rerouted around the Cape of Good Hope, adding 4000 to 6000 nautical miles and 14 to 20 days to

journeys.

Measures

- The union government is also mulling on using alternate trade routes and has asked **Export Credit Guarantee Corporation (ECGC)** not to raise insurance premiums amid rising cost of shipping to Europe.

Topic 59. MISSION KARMAYOGI: THE NATIONAL PROGRAMME FOR CIVIL SERVICES CAPACITY BUILDING (NPCSCB)

Important for the subject: Schemes

Aim:

It aims to transform capacity-building in the bureaucracy **through institutional and process reforms.**

Key Features and objectives of Mission Karmayogi:

- **Holistic Capacity Building:** Mission Karmayogi focuses on the holistic development of civil servants, ensuring they **acquire the right skills, attitudes, and competencies to meet the challenges of governance in the 21st century.**

- **Competency Framework:** The mission introduces a competency framework that identifies specific competencies required for various roles in the civil services. This framework is designed to align with the changing demands of the government and society.

- **Digital Learning Platform – iGOT Karmayogi:** A digital learning platform named "iGOT Karmayogi" has been launched to provide a centralized and integrated platform for learning and development. The **platform offers online courses, training programs, and resources for civil servants.**

- **Individual Development Plans:** Mission Karmayogi emphasizes the creation of Individual Development Plans (IDPs) for civil servants. These plans are **tailored to the specific needs and aspirations of each officer**, allowing for personalized learning and skill development.

- **Collaboration with Institutions:** The mission encourages collaboration with reputed national and international institutions, industry experts, and academia to ensure that civil servants receive cutting-edge training and exposure to best practices.

- **Behavioral Training:** In addition to technical skills, Mission Karmayogi emphasizes **behavioral training to instill the right values, ethics, and attitudes among civil servants.** This includes fostering a spirit of innovation, accountability, and citizen-centric governance.

- **Annual Capacity Building Plans: Departments and ministries are required to**

prepare Annual Capacity Building Plans (ACBPs) under Mission Karmayogi. These plans outline the training needs and strategies for capacity building within their respective organizations.
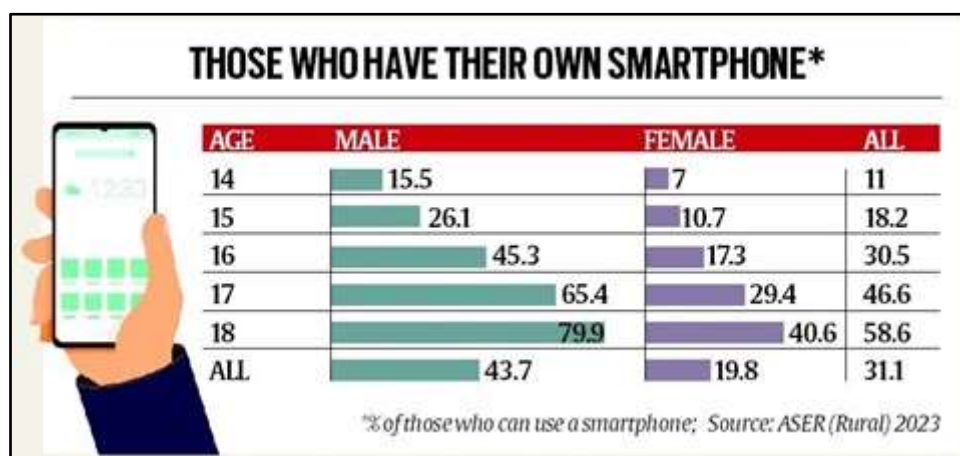
- **Civil Services Competency Atlas:** A comprehensive Civil Services Competency Atlas has been developed as part of the mission. It provides a detailed mapping of competencies required at various levels of governance and for different roles within the civil services.

- **Monitoring and Evaluation:** The mission includes mechanisms for monitoring and evaluating the impact of capacity-building initiatives. This ensures that the training programs are effective in enhancing the performance and capabilities of civil servants.

- **Inclusivity and Diversity:** – Mission Karmayogi aims to make capacity-building initiatives more inclusive by addressing the diverse needs of civil servants. It recognizes the importance of diversity in civil services and encourages equal opportunities for all officers.

Governance Structure:

- **Human Resource Council**: NPCSCB will be governed by the **Prime Minister's Human Resource Council**, which will also include state Chief Ministers, Union Cabinet ministers, and experts.

- **Cabinet Secretary Coordination Unit**: There will be a Cabinet Secretary Coordination Unit comprising select secretaries and cadre controlling authorities.

- **Capacity Building Commission**: It will include experts in related fields and global **professionals**. This commission will **prepare and monitor annual capacity building plans** and audit human resources available in the government.

- Capacity Building Commission (CBC) is conceived as an independent body with full executive power. It is a three-member Commission, supported by an internal Secretariat headed by a Secretary. Members have been appointed from diverse backgrounds such as private sector, academia, public sector, and civil society. The Commission's focus is on driving stand harmonisation across public sector learning and development landscape. CBC has been operational since April 2021.

- **Special Purpose Vehicle:** Finally, there will be a wholly-owned Special Purpose Vehicle (SPV), which will **govern the iGOT-Karmayogi platform.**

- **Monitoring and Evaluation Framework:** An appropriate monitoring and evaluation framework will also be put in place for performance evaluation of all users of the iGOT-Karmayogi platform so as to generate a dashboard view of Key Performance Indicators.

Topic 60. EXPRESS VIEW ON ASER REPORT: CUES FOR REFORM

Important for the subject: Schemes

THOSE WHO HAVE THEIR OWN SMARTPHONE*

AGE	MALE	FEMALE	ALL
14	15.5	7	11
15	26.1	10.7	18.2
16	45.3	17.3	30.5
17	65.4	29.4	46.6
18	79.9	40.6	58.6
ALL	43.7	19.8	31.1

% of those who can use a smartphone; Source: ASER (Rural) 2023

Latest ASER report has **significant pointers on how country** could use education to leverage its demographic dividend. The **latest Annual Status of Education Report (ASER)** focuses on an age group that is critical to India unlocking its demographic dividend — **14- 18-year-olds in rural areas.**

- The report has seen a heartening trend of more students transitioning to secondary education. ASER 2023 notes that **"today more children in India have more years of schooling than ever before". The 2023 survey** focuses on **children's ability to apply reading and math skills to everyday situations and their aspirations.**
- It also sought to capture **their access to digital technology and whether they possess the skills to use it.** The latest report doesn't see enrollment as an end in itself.

Key findings:

- About a **fourth of those surveyed find difficulty in reading a Grade 2 level text in the local language.**

- More than **half struggles with arithmetic skills** in which they should have been proficient in by Grade 5.

- This is a serious deficit that has a bearing on the quality of the country's labor force. **Only 6 percent of the surveyed** are currently doing **vocational courses**

- There is an **increasing pressure on young students** amidst acute academic competition.

- The difficulties of a section of learners get compounded as they have to juggle academic requirements with responsibilities like working in family farms.

- The **use of smartphones** for education today is way less than that for entertainment.

- **About 90%** of surveyed households had smartphones. **Almost 95% boys and 90% girls** could use a smartphone.

Key suggestions:

- ASER suggests reforming **pedagogic processes to reduce pressures** on such students.

- The **increasing use of smartphones in rural areas can be used as an opportunity** to extend education, and design classrooms that are flexible with time and schedules.

- There is a need to nudge students and their parents to use digital technologies for learning.

- **NEP 2020 envisions embedding digital technologie**s in the educational landscape.

- **China is able to realize its demographic dividend** to a large extent by prudent reforms in its technical and vocational education and training systems

About ASER report:

- It is a **nationwide survey of rural education** and learning outcomes in terms of reading and arithmetic skills.

- It is conducted by the **NGO Pratham for the last 15 years.** It has been conducted **every year since 2005 in almost all rural districts of India.**

- **It is the largest** citizen-led survey in India. It is a household-based rather than school-based survey.

- It is also the **only annual source of information on children's learning outcomes** available in India today.

- It uses **Census 2011 as the sampling frame and continues** to be an important national source of information about children's foundational skills across the country.

- The ASER 2023 **'Beyond Basics' survey was carried out among 34,745 y**oung respondents in 28 rural districts in 26 states, including two districts each in **Uttar Pradesh and Madhya Pradesh.**

Topic 61. INDIA'S MULTIDIMENSIONAL POVERTY RATE DOWN TO 11.28% IN 2022-23 FROM 29.17% IN 2013-14

Important for the subject: Schemes
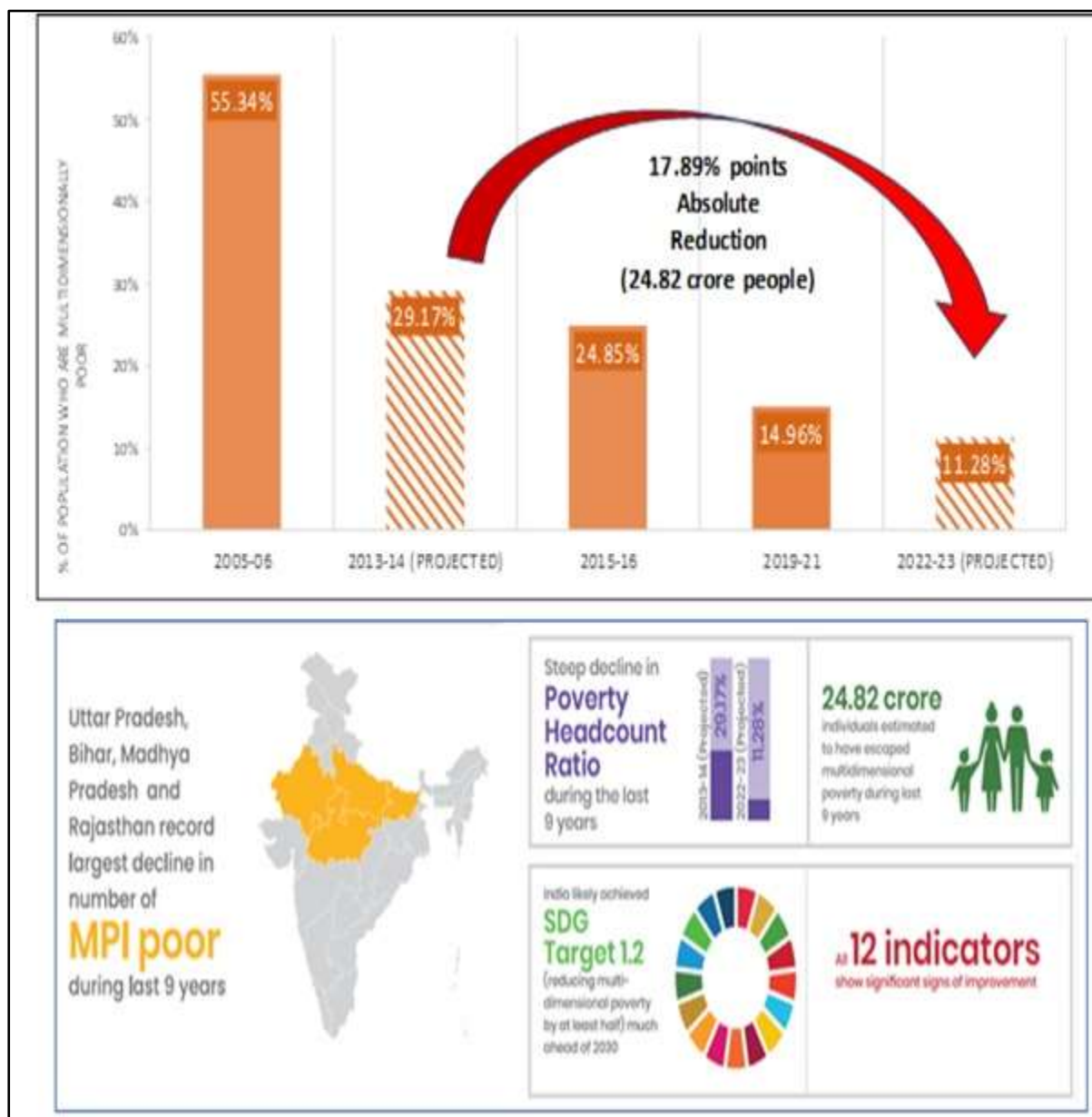
A discussion paper released by NITI Aayog on Monday

According to a NITI Aayog discussion paper, multidimensional poverty in India declined from 29.17% in 2013-14 to 11.28% of the population in 2022-23, with about 24.82 crore people moving out of this bracket in nine years to 2022-23. They also claim that Uttar Pradesh, Bihar and Madhya Pradesh registered the largest decline.

- The Government of India has made remarkable progress in improving the lives of people,

aiming to reduce poverty in all dimensions.

- Noteworthy initiatives like **Poshan Abhiyan and Anemia Mukt Bharat** have significantly enhanced access to healthcare facilities, leading to a substantial decrease in deprivation.

- Operating one of the world's largest food security programs, the **Targeted Public Distribution System under the National Food Security Act covers 81.35 crore beneficiaries**, providing food grains to rural and urban populations.

- Recent decisions, such as extending free food grain distribution under **Pradhan Mantri Garib Kalyan Anna Yojana** for another **five years,** exemplify Government's commitment.

- Various programs addressing maternal health, clean cooking fuel distribution through **Ujjwala Yojana**, improved electricity coverage via Saubhagya, and transformative campaigns like **Swachh Bharat Mission and Jal Jeevan Mission** have collectively elevated living conditions and overall well-being of people.

- Additionally, flagship programs like **Pradhan Mantri Jan Dhan Yojana** and **PM Awas Yojana** have played pivotal roles in financial inclusion and providing safe housing for the underprivileged.

- While the performance of States varies, some States which were traditionally having high poverty have made remarkable progress in helping people escape poverty, thus reducing inter-state disparities in multidimensional poverty.

- With this, the fundamental problems in accessing basic services are getting resolved fast so that the country can look towards becoming a developed nation i.e. Viksit Bharat @2047.

National Multidimensional Poverty Index (MPI):

- The **MPI has been used by the United Nations Development Programme (UNDP)** in its flagship Human Development Report since 2010.

- In this context, **NITI Aayog had published the first edition of national Multidimensional Poverty Index for India in 2021**.

Purpose –

- A national MPI statistic for a country is tailored to the national priorities and therefore, countries choose their own set of dimensions, indicators, weights, and cut-offs, according

to their plans and contexts.

- The report presents an in-depth analysis of the headcount ratio and intensity of multidimensional poverty at the national, State/UT, and district levels.

- The first report was based on the reference period of 2015-16 of the National Family Health Survey (NFHS) - 4.

MPI Parameters & Methodology:

- The Index is based on the **Alkire-Foster methodology developed by its technical partners — the Oxford Poverty and Human Development Initiative (OPHI) and United Nations Development Programme (UNDP) and has three equally weighted dimensions –**

  1. Health

  2. Education

  3. Standard of Living

  These three dimensions are represented by 12 indicators–

- The index is calculated by first setting the deprivation cut-offs for each indicator, i.e., the level of achievement considered normatively sufficient for an individual to be considered not deprived in an indicator.

- For example, the individual has completed at least six years of schooling. Such a cut off would be applied to determine whether the individual is deprived in each indicator.

- Weights are added to each indicator and a composite metric is then used to calculate the index.